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THE AIR POLLUTION BIBLIOGRAPHY. VOLUME I

Jack R. Gibson, et al

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THE
AIR POLLUTION BIBLIOGRAPHY

Volume I

by

Jack R. Gibson
Wave E. Culver
Mary E. Kurz

Compiled for the Public Health Service,
U. S. Department of Health, Education, and Welfare

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PREFACE

The annotated bibliography on air pollution is being compiled by the Technical Information Division, Library of Congress for the U.S. Public Health Service, Department of Health, Education, and Welfare under a memorandum of agreement dated January 31, 1956.

Scope

The bibliography consists of references on the administrative, economic, engineering, legal, medical, and physical-chemical aspects of air pollution and its control. As a result, the subjects treated include: the general field of air pollution; sources of air pollution; pathological and toxicological effects of air pollution; emission and diffusion of air pollutants; sampling, analysis, and measurement of air pollutants; air pollution surveys and statistical studies; atmospheric phenomena; legislation, administration, and enforcement; urban planning and zoning; etc. References concerning air pollution caused by agents of communicable disease, herbicides, insecticides, and radioactive materials are excluded.

The U.S. Bureau of Mines publication, Air Pollution, a Bibliography, by S. J. Davenport, and G. G. Morgis (Washington, Government Printing Office, 1954), containing references published prior to early 1952, serves as the starting point of the Library of Congress Air Pollution Bibliography. The present bibliography, therefore, consists of annotated references to open literature, both foreign and domestic, published since 1952. In addition, federal, state, and local governmental publications which are considered generally available, are or will be included.

over

The material collected is being published in volumes of convenient size; this Volume I contains 750 references (item numbers 1 - 750). It is expected that subsequent volumes of similar size will be produced as sufficient references are processed bibliographically. References in these volumes will also be numbered consecutively, e.g., Volume II will start with item 751.

For reasons of economy of time, it has not been feasible to attempt to compile material published in a given year (e.g., 1952) in any one volume of abstracts. Hence, the references included in Volume I range from 1952 through 1957 in date of publication. In time, however, the earlier material will be completed.

Arrangement

The bibliography is arranged alphabetically by first author, or by the first significant word in the title in the case of anonymous papers. The papers of each author are arranged chronologically, by date of publication. An item number at the upper left of the citation is used to identify each reference.

Form of entry

The material included comes from three major categories: (1) serials; (2) books; and (3) reports. The respective entries are arranged as follows:

(1) Serials: Author, title of paper, name of serial, volume, date of publication, and pagination are given. English translations of foreign language titles are indicated by brackets, and precede the original language titles. The frequently occurring elements of serial titles have been abbreviated (see Serial Title Abbreviations, p. vii).

(2) Books: Author, title, place of publication, publisher, date of publication, and pagination are given.

(3) Reports: Corporate author, title, date of issue, and pagination are given.

Code letters at the end of the citation, right hand side, indicate the library in which the original reference was consulted (see Library Symbols, p. vii). In the case of references seen at the Library of Congress, the call number of the publication and volume number are also included.

Type of abstracts

The abstracts in the bibliography are of the informative type, giving experimental and test data, describing procedures and equipment, and presenting results and conclusions. No attempt has been made to analyze critically the information contained in the original paper.

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Indexes

A detailed subject index, arranged alphabetically, has been provided. The indexing system used is flexible, being developed as needed. Those subject headings assigned are based on the subject content of the abstract itself, and on the title of the original reference. The subject headings are direct, rather than inverted (e.g., Dust collectors, not Collectors, dust), and each main heading is divided as necessary (e.g., Dust collectors--Performance; Dust collectors--Test results). Specific subject headings are preferred (e.g., Cement plants--Control, rather than the more general heading Industrial plants--Control). In the body of the subject index, synonymous terms are indicated by see references, while see also references are used to relate similar material or to refer from general to more specific headings.

In addition, a geographical location index and a personal author index are given. The former is arranged alphabetically by country or state, with subdivisions being established for cities and counties. The latter includes all secondary as well as primary authors arranged alphabetically.

Acknowledgements

The continuing bibliography on air pollution is being compiled under the guidance of personnel of the Division of Sanitary Engineering Services, and the Division of Special Health Services, of the Public Health Service, and special thanks are due Mr. Frank Tetzlaff, Mr. Robert Perman, and Dr. Wilton M. Fisher of these staffs, and Mr. Howard Price, a former staff member, for valuable assistance and advice. Acknowledgements are also due the staffs of various libraries consulted in the Washington area, and to fellow members of the Bibliography Section, particularly Dr. Clement R. Brown, Mrs. Mary E. Schroder and Messrs. Thomas J. Derby and Paul Mudd, for aid in the work of compiling and abstracting references. Finally, we wish to thank the staff of the Publication Section of the Technical Information Division for its work in publishing this volume promptly.

Washington, D. C.
July 1957

SERIAL TITLE ABBREVIATIONS

The following is a key to the serial title abbreviations used herein:

Acad.	Academy
Advanc.	Advancement
Agric.	Agricultural, Agriculture
Amer.	American
Analyt.	Analytical
Ann.	Annals, Annual
Appl.	Applicata, Applied
Arch.	Archiv, Archives
Assoc.	Association
Austral.	Australian
Belg.	Belges
Biochem.	Biochemical
Biol.	Biology
Brit.	British
Bull.	Bulletin
Calif.	California
Canad.	Canadian
Chem.	Chemical, Chemistry
Clin.	Clinical
Coll.	College
Contr.	Contributions
Div.	Division
Elec.	Electric, Electrical
Eng.	Engineering
Exper.	Experiment
Geofis.	Geofisica
Hort.	Horticultural
Hyg.	Hygiene
Indus.	Industrial, Industries
Inst.	Institute
Instrum.	Instrument(s)
Internat.	International, Internationalis
Jour.	Journal

Mech.	Mechanical
Med.	Medical, Medicine
Méd.	Médecine
Meteorol.	Meteorological, Meteorology
Microchim.	Microchimica
Opt.	Optical
Pathol.	Pathology
Phys.	Physics
Physiol.	Physiology
Phytopathol.	Phytopathology
Pollut.	Pollution
Proc.	Proceedings
Progr.	Progress
Publ.	Public, Publication
Quart.	Quarterly
Rec.	Record
Rep.	Reports
Res.	Research
Rev.	Review(s)
Roy.	Royal
S. A. E.	Society of Automotive Engineers
Sci.	Science
Scient.	Scientific
Soc.	Society
Sta.	Station
Surg.	Surgery
Tech.	Technical, Technology
Trans.	Transactions
Univ.	University
Zeitschr.	Zeitschrift

LIBRARY SYMBOLS

DA	U. S. Department of Agriculture, Washington, D. C.
DAFM	U. S. Armed Forces Medical Library, Washington, D. C. (now called National Library of Medicine)
DBS	U. S. National Bureau of Standards, Washington, D. C.
DCU	Catholic University of America, Washington, D. C.
DGS	U. S. Geological Survey, Washington, D. C.
DI	U. S. Department of Interior, Washington, D. C.
DLC	U. S. Library of Congress, Washington, D. C.
DNLM	U. S. National Library of Medicine, Washington, D. C. (formerly called Armed Forces Medical Library)
TID	Technical Information Division, Library of Congress, Washington, D. C.
WU	University of Wisconsin, Madison, Wisconsin

AIR POLLUTION BIBLIOGRAPHY

1

Ångström, A., 1952
and L. Högberg.
ON THE CONTENT OF NITROGEN (NH_4-N, and NO_3-N) IN ATMOSPHERIC PRECIPITATION. Tellus, v. 4, Feb. 1952: 31-42, illus.
DLC (QC801.T4, v. 4)

Some preliminary analysis of the material obtained from observations on the content of nitrogen in precipitation indicate that the concentration of NH_4-N and NO_3-N in precipitation is dependent upon the amount of precipitation previously fallen. There is also a pronounced dependence of the concentration on the character of the air mass. Tropical air contains considerably greater amounts of nitrogen than does either polar or arctic air. The facts would seem to suggest that such material is carried up into the air from the earth's surface in greater quantities through the stronger convection processes at low latitudes. But it is also possible that the existence of nitrogen ions in the atmosphere is connected to some extent with electrical phenomena since thunderstorms are more frequent at low than at high latitudes.

2

Abercrombie, G. F. 1953
DECEMBER FOG IN LONDON AND THE EMERGENCY BED SERVICE. The Lancet, v. 264, Jan. 31, 1953: 234-235, illus. DLC (R31.L3, v. 68)

Dr. Abercrombie, Chairman of the Emergency Bed Service Committee, King Edward's Hospital Fund for London, describes the functioning of that service during the "epidemic" of the London fog, Dec. 2-9, 1952. Applications to the service since early in Nov. had been fairly high because of the prevailing cold weather, but on Dec. 9 applications rose to an unprecedented peak. On that date, 492 applications were received, and 390 cases were admitted; on Jan. 1, 1951 at the height of the influenza epidemic, 293 applications were received, and 185 cases admitted. The increase in sickness was due almost entirely to respiratory disease, which was nearly quadrupled; heart disease cases rose to about 3 times the normal number; and, as in the influenza epidemic, the increase in sickness was almost exclusively within the over-45 and under-5 age group.

3

Abrams, H. K. [1952]
AIR POLLUTION CONTROL: A PUBLIC HEALTH RESPONSIBILITY. In California. Legislature. Assembly. Interim Committee on Air and Water Pollution. Final Summary Rep., [Sacramento], Assembly of the State of California, [1952], p. 97-102. DLC (TD425.C315)

The history of the air pollution problem is discussed, and the major catastrophies in the Meuse Valley (France) and at Donora (Pa.) are mentioned. It is pointed out that the cost of control of air pollution is very high. Cleveland, Ohio in 1949 is said to be spending $103,000 for control measures, and Chicago, Ill. about $200,000. In a recent survey, 26 of 29 industrial communities were found to be actively engaged in pollution control programs. Because air pollution control and industrial hygiene engineering are so intimately related in terms of technique and equipment, there is an increasing tendency to associate the 2 programs administratively and functionally. Successful air pollution control is closely linked with city planning, both being an important part of the public health program.

4

1955
"ABSOLUTE FILTERS." Indus. Chemist, v. 31, July 1955: 361. DLC (TP1.I62, v. 31)

The Vokes 55 "Absolute" air filter consists of filter paper, made of a mixture of fine asbestos fibers and coarse cellulose fibers from asparto grass, set in a wooden frame. Tested with a methylene blue dust cloud, the filter had an efficiency of more than 99.95%, and a penetration of 0.05%.

5

Adams, D. F., 1952
and others.
ATMOSPHERIC POLLUTION IN THE PONDEROSA PINE BLIGHT AREA. Indus. and Eng. Chem., v. 44, June 1952: 1356-1365.
DLC (TP1.I6, v. 44)

An investigation of the contamination of ponderosa pine was organized with 2 objectives: (1) to accumulate information concerning the factors responsible for the contamination; and (2) to reproduce, experimentally, the factors found to cause the blight. Data are given for the average concentrations of fluorine compounds in relation to wind conditions as obtained from analyses of the air. Pollutants analyzed from rain water samples are plotted to show the average dispersion of the contamination. Sulfur compounds, analyzed from the air, showed concentrations of about 0.1 ppm. Sampling apparatus is diagrammed and explained.

6

Adams, D. F. 1956
THE EFFECTS OF AIR POLLUTION ON PLANT LIFE: A REVIEW. Arch. Indus. Health, v. 14, Sept. 1956: 229-245. DLC (RC963.A14, v. 14)

Knowledge of the range of foliar expressions of plants exposed to atmospheric pollutants is extremely useful in the study of the scope and severity of an air-pollution problem. The wide variations in susceptibility and characteristic response of common species to typical contaminants provide a convenient method for identifying, determining the distribution of, estimating the level of, and providing a collection medium for subsequent chemical analysis of a pollutant. A detailed review of the progress of research on the effects of sulfur dioxide, hydrogen fluoride, and "Los Angeles-type" smog since 1950 is presented (with work published prior to 1950 cited to provide continuity whenever necessary). Fluoride appears to be a cumulative phytotoxicant which may move through the plant vascular system to the leaf tip or margin and produce foliar necrosis upon accumulation of a "threshold concentration." Evidence also points toward possible enzymatic inhibition. Sulfur dioxide and smog exposures result in foliar injury only if the rate of tissue absorption exceeds the rate at which the plant can effectively neutralize the toxic agent. Smog, however, can produce growth inhibition without producing visible injury, whereas sulfur dioxide does not produce this so-called invisible injury. Reference is made to a catalogue of common weeds according to their characteristic foliar response and susceptibility to a number of pollutants. (Author's abstract)

7

1955

AEROSOL ABACUS EASES DUST COUNT. Chem. Week, v. 76, Mar. 19, 1955: 92-93, illus.
DLC (TP1.C37, v. 76)

"Eliminating the eyestrain and error of visual microscopy, the Army Chemical Corp's Aerosoloscope [illustrated], puts counting of airborne particles right at engineers' fingertips. It was developed at Camp Detrick (Frederick, Md.) to count and measure airborne germs, dust, and moisture droplets. Pulses from a photomultiplier tube that detects particles as spots of reflected light are counted at the rate of 6000/min, and tallied according to size in 12 ranges between 1 and 64 microns." (Quoted in full)

8

1956

AEROSOL ANALYZER. Chem. and Eng. News, v. 34, Aug. 6, 1956: 3758. DLC (TP1.C35, v. 34)

"A unique particle-size spectrometer, developed by Alexander Goetz, California Institute of Technology . . . sends a continuous stream of air, moving at about 1/3 the speed of sound, into a conical helix rotating at 20,000 to 23,000 rpm. This arrangement, the instrument's unique feature, results in a very small relative velocity between the air stream and the helix, and thus maintains laminar flow in the air stream. The rotating helix subjects the aerosol to centrifugal force of about 25,000 g, and the airborne particles fall out at a rate corresponding to their size. In its present form, the particle size spectrometer will separate quantitatively from aerosols all particles of 0.15 micron and less in size. Refinements now in progress should drop this figure to less than 0.1 micron." (Quoted in part)

9

1953

AEROSOL CAMERA. Mech. Eng., v. 75, Nov. 1953: 890. DLC (TJ1.A72, v. 75)

Atmospheric particles as small as 1/2000 in. have been photographed using an experimental, portable camera developed by the Stanford Research Institute. About 12 exposures are required to photograph one particle in a dense fog, while 10 times that number of exposures are necessary in a moderate fog. With this apparatus, as many as 2000 particles/cu in. have been counted.

10

1955

AEROSOLOSCOPE. Mech. Eng., v. 77, May 1955: 431. DLC (TJ1.A72, v. 77)

This electronic instrument counts and measures particles ranging in size from 1 micron to 64 microns, one at a time, at the rate of 100/sec. The flow rate of the particles is controlled so that individual particles can be reflected in the light path and detected by a photomultiplier tube. The differences in size of the reflections are transmitted to a set of 12 dials, each one measuring particles within a particular size range.

11

Afflerbaugh, C. B. 1955
IT'S O.K. IN LOS ANGELES. Amer. City, v. 70, Dec. 1955: 72-74. DLC (HT101.A5, v. 70)

An incinerator capable of burning 75 tons of refuse/24 hr has met the following standards for emissions in Los Angeles County, Calif.: (1) smoke must not exceed no. 2 Ringelmann color; (2) particulate emissions must not exceed 0.40 grains/cu ft, adjusted to 12% carbon dioxide; and (3) condensible materials must be controlled. Refuse is fed to the furnace at 3 1/4 tons/hr, and the gas stream after burning is split, the 2 streams then being forced into each other at 4-7 ft/sec. The low flow rate and resulting turbulence in the stream cause the fly ash to settle out, thus eliminating the need for a gas scrubber. The building is located on a 25-ft hill and has a 100-ft stack.

12

1955

AIR AND WATER POLLUTION CONTROL. New York Univ. Coll. of Eng. Res. Div. Ann. Rep., 1955: 14-15.
TID

A low-speed wind tunnel designed especially for air-pollution studies reproduces, at a scale of 1:360, the sources of air pollution, surrounding structures and terrain, and prevailing meteorological conditions. This research is concentrated on means of sending airborne waste high enough, quickly enough so that it is diluted by the air. Tests were conducted to determine the location, height, ejection speed, and gas temperature of a single 500-ft stack designed to eject fumes to an altitude of 1500 ft at the ore-reduction plant of Kaiser Aluminum and Chemical Corp., Chalmette, La. At Buchanan, N. Y., the site of a proposed plant, a 300-ft instrument tower is collecting data on gas diffusion. A study is being conducted also on theories of turbulent diffusion of clouds resulting from munitions explosions.

13
1956
AIR METER. Chem. and Eng. News, v. 34, Apr. 23, 1956: 2088. DLC (TP1.C35, v. 34)

"[An] air meter, [produced] by Hastings Instrument, assists in smog control studies, by measuring minute airflow movements. With a range of 0 to 30 mph, and a logarithmic-type meter scale which provides expanded readings in the low velocity range, the meter assures excellent readability below 5 mph, and unusual accuracy below 1 mph. Response time [is] less than 1 sec." (Quoted in full)

14
1956
AIR POLLUTION FROM STEEL PLANTS; A NEW AMERICAN ORDINANCE. Smokeless Air, v. 26, Spring 1956: 187-188. DLC (TD884.S855, v. 26)

"The Smoke Control Ordinance of Allegheny County, Pa., as amended in July 1955, reveals a determined effort to control air pollution from steel plants where this is practical, and to force the industry to carry out research in allied problems. Those steel and allied processes specifically mentioned in the ordinance, are exempt from the general article of the ordinance which prohibits smoke in excess of no. 2 Ringelmann chart. Requirements of the ordinance in respect to steel and allied processes are summarized under the following headings: blast furnaces; coke ovens; open-hearth furnaces; heating and reheating furnaces; puddling furnaces; sintering; cupolas; air furnaces; and nonferrous foundries. Operators of blast furnaces, coke ovens, open-hearth furnaces, Bessemer converters, electric furnaces, and nonferrous foundries, are required to: (a) undertake or participate in a program of research to determine practical methods of controlling emissions from the particular process involved; and (b) report annually indicating the research progress. Some control is exercised regarding smoke. Whether or not the gas is used, grit emission from blast furnaces is controlled except during slips. It is suggested that the 2 compulsory requirements outlined above might well be included in the new Clean Air Bill." (Quoted in part)

15
1955
AIR POLLUTION IN FLORIDA. Arch. Indus. Health, v. 12, Nov. 1955: 567 DLC (RC963.A14, v. 12)

An example of air pollution in central Florida is cited. Five of 6 phosphate rock-treating plants, which were making their own sulfuric acid by the contact process, were located in an area about 6 miles in length. For a distance of about one-half mile around each plant, there was a marked destruction of pine trees and some damage to other vegetation, as well as numerous complaints from persons in the area of irritation to throats and to mucous membranes. As a result, a method for field detection of sulphur dioxide was adapted and tested in the laboratory. Preliminary results only are reported.

16
1956
AIR-POLLUTION ABATEMENT. Chem. Trade Jour., v. 138, Jan. 20, 1956: 175.
DLC (HD9650.1.C5, v. 138)

F. Crass, Jr., recently told a meeting of the Industrial Hygiene Foundation that the US chemical industry spends at least $40 million annually on air-pollution abatement, concentrating activities on: supply of information to top-level industry executives on progress of air-pollution abatement; encouragement of continued research; evaluation of existing data; dissemination of information to the public; and assistance to state and federal officials in connection with proposed legislation.

17
1954
AIR-POLLUTION CONTROL. Utilization, v. 8, May 1954: 34, illus. DLC (TP315.U85, v. 34)

"When, late in 1952, the Purina Ralston Co. increased its steam-generating facilities at the Davenport, Iowa plant by the replacement of 1 of the 100-hp boilers with a new 300-hp unit fired by spreader stoker, plans were also undertaken for control of the fly ash which had hitherto been allowed to disperse over the surrounding residential areas and plant property. It was felt that reduction of air pollution would result not only in improved public relations but also would provide protection against product contamination from this source. A tubular dust collector arranged for decantation, together with a combined fan-stack, was installed. The decantation feature of the dust collector has made it possible to separate the high-carbon content particles from the smaller noncombustible particles and to reinject the former back to the furnace with an increase in over-all efficiency. The noncombustible particles deposited in the hopper are conveyed by the ash-disposal system to waste. The dust collector is so designed that peak efficiency can be maintained while operating either one or both boilers, and is controlled by means of collector inlet dampers." (Quoted in part)

18
1952
AIR-POLLUTION PROBLEMS. Internat. Chem. Eng. and Process Indus., v. 33, Jan. 1952: 38.
DLC (TP1.C355, v. 33)

Various methods for controlling the emission of effluents from industrial processes are presented. Cyclone separators and electrostatic separators, operating either separately or in combination, are suggested for collecting fly ash. Smoke, fly ash, and noxious gases may be removed by washing the flue gases; however, the wash water becomes acid and may be corrosive. Gases and smoke are efficiently dispersed by emission from a high chimney at gas velocities up to 120 ft/sec. Meters which record light intensity are recommended for smoke or dust measurements.

19

1956

AIR-POLLUTION RESEARCH. Chem. and Eng. News, v. 34, Feb. 13, 1956: 692.
DLC (TP1. C35, v. 34)

"The Public Health Service has allocated $392,000 to 3 agencies for research into air pollution. The funds, part of 1.8 million voted by the last Congress for this purpose, have been apportioned as follows: Weather Bureau, $196,000, to study dilution and dispersal of contaminants in the air. National Bureau of Standards, $98,000, to develop methods for analysis and identification of gaseous contaminants; to collect, treat, and analyze concentrated samples of atmospheric pollutants; and to study aerial reactions between gases and chemicals that may cause pollution. Bureau of Mines, $98,000, to determine how different oils and fuels in autos, trucks, buses, and other vehicles affect air contamination; to develop simple and inexpensive methods for identifying and measuring exhaust gas compounds that contribute to air pollution problems; to improve design and methods of operating incinerators to curb pollution; and to determine the most effective low cost methods for removing sulfur dioxide from stack gases at furnaces and processing plants." (Quoted in full)

20

1953

AIR-POLLUTION STUDY. Mech. Eng., v. 75, Aug. 1953: 647-648. DLC (TJ1. A72, v. 75)

Excerpts from a report of a joint Canadian-American committee, organized to study air pollution along the Detroit River, are given. Air in the area was sampled 10 ft above the ground. On the whole, the amount of particulate matter ranged between 100-350 microgram/cu m of air, and spectrographic analysis identified 24 elements. Dust counts by the standard light-field technique and particle-size determinations by the impinger method and thermal precipitator showed values of 0.7 MPPcf and 0.94 micron, respectively. About 3/4 of the sulfur dioxide measured by the Thomas Autometer was less than 0.10 ppm.

21

1956

AIR-POLLUTION STUDY PUBLISHED. Amer. City, v. 71, Jan. 1956: 142. DLC (HT101. A5, v. 71)

Of the 2 categories of air pollution, smoke from coke and fuel oil, and fumes and gases from combustion and evaporation, the latter is believed to be the biggest future problem. The following alerts are given by the Los Angeles Air Pollution Control District according to the amount of contamination in the air: (1) stop outdoor burning; (2) limit operation of car, trucks, and buses; and (3) shut down all industry and traffic. These alerts were legislated because of the critical physiological effects of smog and certain mixtures of pollutants.

22

1955

[AIR-POLLUTION SURVEY]. Chem. Week, v. 76, Apr. 2, 1955: 10. DLC (TP1. C37, v. 76)

A survey conducted in some 40 cities by Pendray & Co., New York public relations counseling firm, revealed that chemical companies are still regarded as the principal offenders despite their numerous efforts to curb air pollution. The following, in order of frequency of mention, were listed as prime objects of complaints about fumes and odors: chemicals, automotive vehicles, paint and varnish, food processing; farther down on the list were plastics, pharmaceuticals, soaps and detergents.

23

Altshuller, A. P. 1956
THERMODYNAMIC CONSIDERATIONS IN THE INTERACTIONS OF NITROGEN OXIDES AND OXYACIDS IN THE ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 97-100.
DLC

The oxides of nitrogen in the air are formed by high temperature reactions between nitrogen and oxygen in the combustion processes in domestic and industrial furnaces and incinerators, and in the exhaust from gasoline-, diesel-oil, and propane-burning vehicles. Nitric oxide and nitrogen dioxide exist in concentrations from pphm to ppm, and nitrous oxide has been measured at about 0.5 ppm by mass spectrographic analysis and infrared spectroscopy. Nitrous oxide, formed by the reaction between nitrogen and atomic oxygen, reacts with ozone to form nitrogen dioxide, which can be decomposed by ultraviolet radiation to give nitric oxide and ozone in the presence of atomic oxygen. In the presence of light, ozone also reacts with nitrogen dioxide and water to form nitric oxide. The equilibrium constants for some of these reactions are tabulated.

24

Amdur, M. O., 1952
R. Z. Schulz, and P. Drinker.
TOXICITY OF SULFURIC ACID MIST TO GUINEA PIGS. Arch. Indus. Hyg. and Occupat. Med., v. 5, Apr. 1952: 318-329.
DLC (RC963. A14, v. 5)

The toxicity of sulfuric acid mist, a fairly common atmospheric contaminant, with a mean particle size of 1 micron was considerably greater for guinea pigs 1 to 2 months old, than it was for those

1.5 yr old. Of the 2 toxic actions of a sulfuric acid mist, the laryngeal spasm depended on concentration much more than on time of exposure, while the severity of the deep-seated damage of the lungs depended on total dosage rather than on concentration alone.

25

Amdur, M. O., 1952
L. Silverman, and P. Drinker.
INHALATION OF SULFURIC ACID MIST BY HUMAN SUBJECTS. Arch. Indust. Hyg. and Occupat. Med., v. 6, Oct. 1952: 305-313.
DLC (RC963.A14, v. 6)

The experimental inhalation of sulfuric acid mists in concentrations ranging from 0.35 to 5.0 mg/cu m by human beings brought about various respiratory changes which were studied by pneumotachograph. These changes were of a reflex nature causing shallower and more rapid breathing. At the highest concentration, the fumes were easily detected by all subjects, and brought about more pronounced and varied changes, the main response being a decrease in minute volume. (Authors' abstract in part)

26

Amdur, M. O., 1953
W. W. Melvin, and P. Drinker.
EFFECTS OF INHALATION OF SULPHUR DIOXIDE BY MAN. The Lancet, v. 265, Oct. 10, 1953: 758-759, illus. DLC (R31.L3, v. 265)

During the worst period of the London fog of Dec. 1952, the densest concentrations recorded for sulfur dioxide in the air, were 1.339 ppm, and for smoke 4.46 mg/cm. Both values were much higher than normal for that season of the year. In these experiments when normal people inhaled sulfur dioxide in concentrations of 1 to 8 ppm for 10 min, there was more shallow and rapid respiration and increased pulse rate in all instances. Men who worked daily in atmospheres containing sulfur dioxide at 10 or more ppm showed no changes when exposed experimentally to levels of 5 ppm. (Authors' abstract in part)

27

Amdur, M. O. 1954
EFFECTS OF A COMBINATION OF SO_2 AND H_2SO_4 ON GUINEA PIGS; A PRELIMINARY REPORT. Publ. Health Rep., v. 69, May 1954: 503-506, illus. DLC (RA11.B17, v. 69)

A much more marked depression of growth, more severe lung pathology, and altered respiration was shown by guinea pigs when they were subjected to an aerosol of sulfuric acid (8 mg/cu m) and sulfur dioxide (89 ppm) given in combination than that predicted from the effects of either given alone. Both the depression of growth and the severe lung pathology were markedly aggravated by repeated exposure. Further studies using different concentration combinations of the aerosol are needed before an explanation of the nature of the joint toxic action of these 2 compounds can be postulated.

28

Amdur, M. O., 1954
and L. Silverman.
DIRECT FIELD DETERMINATION OF LEAD IN AIR. Arch. Indus. Hyg. and Occupat. Med., v. 10, Aug. 1954: 152-157, illus.
DLC (RC963.A14, v. 10)

A filter paper spot-test has been developed for evaluating the particulate lead content of air; it is based on the fact that tetrahydroxyquinone forms a colored complex with lead. The method is reported to be simple, rapid, and reasonably accurate, acting as a supplement to the rather lengthy, routine, chemical analysis for lead.

29

1954
ANALYSIS OF HYDROGEN FLUORIDE GAS. Instruments and Automation, v. 27, Mar. 1954: 350, 353. DLC (TA165.A2, v. 27)

A new method of identifying and continuously measuring hydrogen-fluoride gas... has been developed at Stanford Research Institute. The new device can detect and measure ppb of hydrogen fluoride gas in the atmosphere. Detection is made on a roll of filter paper impregnated with a fluorescent metal salt. Contact with the slightest trace of hydrogen fluoride gas diminishes the fluorescence, which is measured photoelectrically. Results are graphed on a continuous recorder. (Quoted in full)

30

Anderson, E. F. 1953
KEEP THOSE DIFFUSER PLATES CLEAN. Amer. City, v. 68, July 1953: 122-124.
DLC (HT101.A5, v. 68)

Different types of dust collectors for filtering air having a dust concentration of 4 to 15 mg/1000 cu ft were studied by the Sanitary District of Chicago, Ill. Attention was focussed on cloth filtration in which the cloth serves as a framework for the dust cake which actually collects the dust. To shorten the time required to build up the cake and to prevent fine particles from clogging the cloth itself, filter aids were placed in the bags of the collectors. The dust cakes formed on the tubes were removed mechanically about once a year. As one of the 12 individual filter compartments was being cleaned, the others continued to operate handling as much as 720,000 cu ft/min of air. Similar ultra filtration installations were used at Mishawaka, Ind. and Santa Rosa, Calif. handling 4,500 cu ft/min and 800 cu ft/min of air, respectively.

31

Anderson, E. F. 1956
CONTROLLING FUME FROM FOUNDRY CUPOLAS. Indus. Wastes, v. 1, May-June 1956: 178-179, illus. DLC

A fume-control system for a 54-in. cupola of the Lincoln Foundry Corp., Los Angeles, Calif. is described. The first step in construction of the control system was to increase the cupola stack height by 10 ft to provide space for secondary combustion of the gases. A moveable baffle was also built to limit infiltration of air through the cupola charging door. This reduced the air-to-gas ratio and caused the gases to burn. The average stack temperature increased from 1046° to 1580°F. An average volume of 29,000 cu ft/min of stack gases are then cooled in 2 stages by evaporation of water vapor. A 78-in. by 32-ft quencher cools the gases to about 420°F and a 96-in. by 20-ft cooler cools them to nearly 270°F. Both units are equipped with spray nozzles to distribute the cooling water. After cooling, approximately 16,900 cu ft/min of gases remain (including cooling water vapor). These are filtered through Orlon cloth bags to remove the very small particles in the gases. The cloth filters are in the form of tubes 5-in. in diameter and 112-in. long. The collector is divided into 5 compartments. During operation, each compartment is taken out of operation at 15-min intervals so that the particles can be shaken automatically from the cloth bags. The filtered gases, containing practically no solids, are released to the atmosphere. The filter bags have been in operation for 4 yr without replacement. (Publ. Health Eng. Abstracts, v. 36, Oct. 1956: 1)

32

Andrew, S. P. S. 1954
A RAPID METHOD OF MEASURING ABSORPTION RATES AND ITS APPLICATION TO CO_2 ABSORPTION INTO PARTIALLY CARBONATED AMMONIA LIQUOR. Chem. Eng. Sci., v. 3, Dec. 1954: 279-286, illus. DLC (TP1. C366, v. 3)

Absorption rate measurements, applicable to large scale packed towers, were determined in an experimental tower. The experimental tower consisting of a vertical glass tube packed with 76 ceramic discs, each set at right angles to the one preceding and following is illustrated. The gas flow was maintained at about 8 ft/sec; the driving force promoting absorption was read directly from meters outside the tube; and the ammonia liquor, into which the carbon dioxide was absorbed, was varied up to 11 N. The effects of carbon dioxide driving force, the liquor flow rate, the strength of liquor, and the carbonation ratio on the absorption of carbon dioxide are graphed.

33

1956
[ANTISMOG TOWER SCRUBBER]. Science, v. 123, June 8, 1956: 1050. DLC (Q1. S35, v. 123)

"An antismog tower (Turner and Brown, Ltd., Bolton, England) is claimed to be 100% efficient in scrubbing air that is saturated with sulfuric and hydrochloric acids, and 99% efficient for air that is saturated with nitric acid. Designed for the elimination of acid fumes that are discharged by chemical and industrial plants, the tower is capable of scrubbing 14 to 20 liters of evaporated acid/hr. Gas removal is carried out in 3 stages – absorption in liquid of the greater part of the gases, elimination of suspended globules of moisture, and neutralization of traces of gas by a chemical reagent that is contained in a tray." (Quoted in full)

34

1955
[API COMMITTEE REPORTS] SMOKE AND FUMES COMMITTEE. Petroleum Processing, v. 10, May 1955: 696. DLC (TP690. A1P37, v. 10)

The status of the committee's research programs on the fundamentals of air pollution is given. (1) An ozone survey of several large cities in the east, including Washington, D. C., conducted by the Kettering Research Institute of Cincinnati, showed the presence of low ozone concentrations which characterize nonsmog conditions in Los Angeles. (2) Research at Armour Research Foundation showed that an insignificant quantity of hydrocarbons are discharged into the atmosphere by several types of domestic and industrial installations burning petroleum products. An instrument method of determining specific amounts of ozone in polluted air is being developed. (3) A radioactive metallic compound has been used to trace the path of stack gases in tests at the Industrial Hygiene Foundation of America, at Pittsburgh. (4) Research at the Engineering Experiment Station at the University of Illinois showed that the vapor-phase oxidation of sulfur dioxide to sulfur trioxide, in the presence of nitrogen dioxide, occurs too slowly to account for the reduced visibility in urban areas. Some materials catalyze the rate of oxidation of sulfur dioxide. (5) The mechanism of possible atmospheric reactions, in sunlight, between gasoline-type hydrocarbons, ozone, nitrogen dioxide, and nitric acid is being studied at the Franklin Institute in Philadelphia. (6) At Stanford Research Institute, the mechanism of ozone formation is being studied.

35

Appleman, H. 1956
A NOTE ON THE EFFECT OF AIRCRAFT EXHAUST ON AIRPORT VISIBILITY. Bull. Amer. Meteorol. Soc., v. 37, Jan. 1956, 19-21. DCU

An analysis of the poor visibility conditions caused by the landing of jet aircraft at Goose Bay, Labrador, on Dec. 4, 1954 is presented. It was tentatively concluded that the combustion of hydrocarbons resulted in the formation of smoke particles and hygroscopic nuclei which, when coupled with relatively high humidity and stability in the lower atmosphere, results in haze.

36

Asset, G., 1954
and D. Pury.
DEPOSITION OF WINDBORNE PARTICLES ON HUMAN SKIN. Arch. Indus. Hyg. and Occupat. Med., v. 9, Apr. 1954: 273-283, illus.
DLC (RC963.A14, v. 9)

Wind-tunnel studies were made, at low velocities of 2 and 5 mph, on the deposition on either a glass cylinder or on human forearms of an aerosol of triphenyl phosphate of low concentrations and small particle sizes (MMD 1.3 and 6.5 microns). No deposition was detectable on the glass cylinder, and very little on the hairy surfaces of the forearm on the downwind side, but very significant amounts of triphenyl phosphate were found on the forearm when facing the wind. The efficiency of deposition increased somewhat with wind velocity, and markedly with particle size. This study indicates the possibility of contamination of human skin under conditions which would not cause contamination of smooth surfaces.

37

Asset, G., 1956
L. E. Gongwer, and S. Ryan.
NASAL PENETRATION OF PARTICLES OF SMALL INERTIA IN EXPERIMENTAL ANIMALS. Arch. Indus. Health, v. 13, June 1956: 597-601, illus.
DLC (RC963.A14, v. 13)

The freshly killed heads of laboratory animals were exposed in a wind tunnel to a slow (2.5 mph) air flow, laden with particles of triphenyl phosphate. These 1.3-micron diameter particles having small inertia would be expected to follow the air stream. The ratio of the aerosol concentration of the air which had passed through the nose to that of the air in the tunnel was taken as nasal penetration. For rabbits this averaged approximately 92.7%; for dogs, 85%; and for guinea pigs, 76%. Wind direction appeared to have no influence on nasal penetration.

38

Atkinson, J. R. 1955
UNCHARGED CONDENSATION NUCLEI PRODUCED BY ULTRAVIOLET LIGHT. Geofis. pura e appl., v. 31, May-Aug. 1955: 54-59, illus. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955)
DGS

Detailed studies were undertaken in an attempt to explain the way in which condensation nuclei are produced by the action of a beam of ultraviolet light within an expansion chamber. It was concluded that, although possibly not the only source, it was the rubber component of the chamber which was the major source of the nuclei. These findings imply that only apparatus free from rubber should be used in studies of condensation nuclei associated with a given gas or vapor.

39

1956
ATMOSPHERIC ANALYZER. Chem. and Eng. News, v. 34, May 21, 1956: 2603.
DLC (TP1.C35, v. 34)

"[An] atmospheric analyzer produced by Harold Kruger Instruments, detects and continuously records low concentrations of oxidants, nitrogen dioxide, nitric oxide, and sulfur dioxide present in the atmosphere or in other gases. The instrument will detect and record concentrations below 1 ppm. It responds to a concentration change of 98% in 2 min. One instrument measures up to 3 pollutants, and hence involves considerably less outlay than 2 or 3 separate instruments usually needed to measure 2 or 3 gases." (Quoted in full)

40

1953
ATMOSPHERIC POLLUTION. The Lancet, v. 264, Jan. 31, 1953: 240.
DLC (R31.L3, v. 264)

Deaths registered in Greater London in the 5 weeks ending Jan. 3, 1953, were 15,114, compared with 9125 in the corresponding period a yr earlier. There were 34,764 deaths registered in 124 English towns during the same period compared with 25,821 a yr earlier. Hospital admissions in Greater London were 6852 in Dec. 1952 and 4300 in Dec. 1951. While a large part of the increase in Greater London could be attributed to the fog, the trend of the figures for deaths did not suggest that the fog caused any substantial increase in the rest of the country. It was brought out that the Atmosphere Pollution Research Committee was cognizant of the fact that 4703 persons died in the Greater London area during the week ending Dec. 13, 1952 as compared with 1852 during the corresponding week of 1951, a large part of the increase being attributed to the fog.

41

1953
ATMOSPHERIC POLLUTION. Gas World, v. 137, Feb. 7, 1953: 374.
DLC (TP700.G2, v. 137)

A review of the meteorological factors, contamination, and damage which existed during the London fog of 1952 is given. Lack of air movement and cool temperatures prevented dissipation of the pollutants in the air. The amount of smoke, measured in mg/cu m of air, was 9 times the normal figure, while the parts of sulfur dioxide/million parts of air were 7 times greater than normal.

42

1955
AUTO EXHAUSTS AND SUN HELD CAUSE OF SMOG. Sci. News Letter, v. 67, Jan. 22, 1955: 55.
DBS

A. J. Haagen-Smit and M. M. Fox reported at a meeting of the Society of Automotive Engineers in Detroit that ozone is formed when bottled automobile exhaust gases are exposed to sunlight. The nitrogen dioxide and hydrocarbons poured into the air during stop-and-go driving favor this reaction, and the experimental concentrations were very similar to the conditions actually measured in Los Angeles.

43

1955
AUTOMATICALLY RECORDING THE DENSITY OF GASES. Gas World, v. 142, Aug. 6, 1955: 326.
DLC (TP700. G2, v. 142)

An instrument which automatically measures the density of gases is diagrammed, and its parts and operation are described. The density is recorded as wt/cu ft within an accuracy of ±1%.

44

Avy, A. P. 1955
AIR POLLUTION BY DUST, SMOKE AND VAPORS. Chapter 25. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 264-272. DLC (TD883.I5, 1955)

This paper is based on air-pollution studies in France, Holland, and England. The topics discussed include: (1) the applicability of mathematical and empirical relationships used to estimate air pollution; (2) attempts to identify fluorine compounds in the stack emissions of an aluminum plant, to establish a relationship between the amount of pollution, its frequency of emission, and intoxicating effects on livestock, and to establish effective control methods; (3) principles on which French air-pollution legislation is based; and (4) surveys conducted to determine whether sulfur dioxide or carbon dioxide concentration in air gives the better indication of degree of air pollution in cities.

45

1955
Azevedo, N. Ferreira dos Santos de
ABIOTIC DISEASE IN FOREST SPECIES. Chapter 23. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 245-251.
DLC (TD883.I5, 1955)

The sulfur dioxide damage to pines and eucalyptus and other vegetation in the woods surrounding the "Mina do Pintor", a small mine in Portugal working a smelter for pyrites, is described. Injured eucalyptus leaves contained 0.0958 to 0.228% water-soluble sulfur and 0.405 to 0.728% total sulfur. The exhaust gas from an oil engine in a brickyard caused similar damage to maritime pines, blue gums, and eucalyptus trees. High concentrations of sulfur dioxide were found in the damaged leaves and needles which had abnormally wide stomatal apertures, and sooty-tarry deposits clogged the stomatal chambers.

46

Bady, S. M., 1953
and C. D. Kelly.
NUMBERS OF FUNGI AND BACTERIA IN TRANS-ATLANTIC AIR. Science, v. 117, May 29, 1953: 607-609. DCU

A quantitative study was made of the number of fungi and bacteria in the air over the Atlantic Ocean during June and Aug. 1951. Fungi were present in all samples during Aug. but were absent from some samples collected in June. The presence of organisms may be related to air masses, with polar air masses having fewer microorganisms than tropical air masses. Cell and spore counts are included in the paper; however, species identification is not presented.

47

Bailey, J. A. 1954
PHILADELPHIA DOUSES ITS DUMPS. Amer. City, v. 69, Nov. 1954: 68-69.
DLC (HT101.A5, v. 69)

Refuse studies and reconstruction designs for incinerators are considered in view of Philadelphia's ordinance on air pollution that no more than 0.85 lb. of solid matter/1000 lb of gas with a 12% carbon dioxide content be discharged from a chimney.

48

Barker, K., 1954
and P. F. Corbett.
THE EFFECT OF AUXILIARY FUEL FIRING ON THE SO_3 CONTENT OF FLUE GASES FROM A COAL-FIRED BOILER. Jour. Inst. Fuel, v. 27, Oct. 1954: 495-502, illus. DLC (TP314,I6, v. 27)

A series of trials is described in which attempts were made to produce small quantities of carbon smokes in a coal-fired power station with the object of reducing the sulfur trioxide content of the flue gases. The experiments involved burning: (a) pulverized pitch in auxiliary pulverized fuel burners; (b) a moderately high-volatile coal in these burners using partly-inert gases as a carrier; (c) auxiliary fuel oil at the back of the combustion chamber, with and without the use of auxiliary pulverized coal; and (d) auxiliary creosote pitch at the back of the combustion chamber, with and without the use of auxiliary pulverized coal, additional to the coal normally fired on the chain-grate stoker. From measurements of the rate of acid buildup on the dew-point meter, it can be seen that all these expedients produce some reduction, but that creosote pitch as an auxiliary fuel is the most efficient. (Authors' abstract)

49

Barnard, C. H. 1954
INCREASED EFFICIENCY AND DECREASED SMOKE WITH BOILER INSTRUMENTS AND CONTROLS. Air Repair, v. 4, May 1954: 20-25. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

This article describes analyzing and control equipment, and installations for small- and medium-size boiler furnaces generating steam for power and process purposes. The operation and uses of:

(1) a combination oxygen and combustibles analyzer which determines the excess air and unburned combustibles in flue gas, and (2) a smoke density measuring system are discussed.

50

Bartel, A. W., 1952
and J. W. Temple.
OZONE IN LOS ANGELES AND SURROUNDING AREAS. Indus. and Eng. Chem., v. 44, Apr. 1952: 857-861. DLC (TP1.I6, v. 44)

An explanation of the cracking of rubber products in the Los Angeles, Calif. area is investigated. Air was sampled daily for 10 min at 5 l/min between 12 noon and 2 p.m., and measured by the iodine released from a potassium iodine solution by the oxidant. Tabular data for the ozone equivalent at Los Angeles are plotted to show general trends of oxidant. This trend is compared with similar measurements in other cities.

51

Barth, W. 1955
[THE PURIFICATION OF GASES BY MEANS OF THE CYCLONE SEPARATOR] Die Reinigung von Gasen mit Hilfe von Zyklonabscheidern. Zeitschr. Erzbergbau und Metallhüttenwesen, v. 8, Mar. 1955: 109-111. DBS

The theory of operation of the dust separators is presented, and illustrations of several types are given. Definitions and equations are also given for calculating the performance of an installation.

52

Bashforth, G. R. 1954
THE BASIC OPEN HEARTH PROCESS. I. SOME THEORETICAL CONSIDERATIONS. Brit. Steelmaker, v. 20, Mar. 1954: 88-93.
DLC (TN704.G7375, v. 20)

In the basic open-hearth furnace, a series of oxidizing processes take place in which impurities are oxidized and their oxidation products converted into compounds which are stable in a basic slag. The steel must then be deoxidized to make it suitable for further treatment. The various chemical reactions involved are considered. In addition, the complex problems of sulfur removal, which unlike other impurities cannot be solved by oxidation, are discussed.

53

1955
THE BATTLE AGAINST SMOG. Jour. Amer. Med. Assoc., v. 158, June 4, 1955: 403.
DLC (R15.A48, v. 158)

The Air Pollution Foundation was incorporated in Nov. 1953 as a nonprofit organization to help in collecting fundamental knowledge on the smog problem, especially as it exists in the Los Angeles Basin. Foundation studies are being carried out: to facilitate forecasting of smog conditions and the issuing of warnings; to analyze compositions and amounts of gases emitted by incinerators; and to improve the combustion and reduce the pollution from motor-fuel exhausts. It was stated that the Los Angeles Basin is a smog-laden area because the cool air moving in from the ocean is entrapped by a warmer layer of air through which it can not rise to pass over the encircling mountains. Also, Los Angeles uses individual open incinerators for disposal of domestic combustible refuse. Air contamination from this source, and from domestic heating, contributes about 20% to the total air pollution of the area.

54

Baum, W. A., 1955
and L. Dunkelman.
HORIZONTAL ATTENUATION OF ULTRAVIOLET LIGHT BY THE LOWER ATMOSPHERE. Jour. Opt. Soc. Amer., v. 45, Mar. 1955: 166-175. DLC (QC350.06, v. 45)

The horizontal attenuation of ultraviolet light by the air near the ground was determined as a continuous function of wavelength from 2300 to 4600 Å. Measurements were made by means of photographic spectrophotometry at Pasadena, Calif. and Washington, D. C. The results are given in the form of a table of attenuation curves for conditions ranging from fog to exceptionally clear air. Air pollutants, though frequently present, were not spectroscopically identified except for sulfur dioxide, which was encountered in measurable concentration in Washington. Ozone concentrations could be estimated from a few spectra obtained in exceptionally clear weather. (Authors' abstract in part)

55

Baynton, H. W. 1952
THE DETROIT-WINDSOR AIR POLLUTION STUDY. ENVIRONMENTAL STUDIES. METEOROLOGICAL ASPECTS. Publ. Health Rep., v. 67, July 1952: 668-669. DLC (RA11.B17, v. 67)

The meteorological study in the Detroit-Windsor area, which is currently in the organizational stage, will be aimed at determining and evaluating the meteorological factors which control the ability of the atmosphere to remove and disperse contaminants. Such a study will be primarily one of winds, atmospheric stability, and precipitation. From purely meteorological and geographic considerations, conditions favorable for a disastrous smog are less probable in this area than in the Donora, Pa. area. It is hoped that the meteorological study will reveal what conditions are prerequisite in the area for a disastrous smog, and what are the probabilities of its occurrence. Since there are 23 stations in or near the area taking complete or partial observations, only a few special installations will be added to the existing network.

56

Beadle, D. G., 1954
P. H. Kitto, and P. J. Blignaut.
PORTABLE ELECTROSTATIC DUST SAMPLER WITH ELECTRONIC AIR FLOW. Arch. Indus. Hyg. and Occupat. Med., v. 10, Nov. 1954: 381-389, illus. DLC (RC963.A14, v. 10)

A portable electrostatic dust sampler (42 lb) is described, which is capable of collecting airborne dust for chemical or x-ray analyses. It operates directly from electric power lines or from batteries, and will perform with high efficiency at 100 cu ft/min for 12 to 15 hr. In cases of low air velocities, its own "electric wind" will give a minimum air flow of 40 cu ft/min past the collecting plates.

57

Beardsley, C. W., 1955
and N. J. Krotinger
EVALUATION OF ODORS. Sewage and Indus. Wastes, v. 27, Feb. 1955: 157-160.
DLC (TD511.S4, v. 27)

A convenient method of odor evaluation has been developed by the Department of Public Works of the City of Los Angeles, Calif. Polyethylene bags (10- by 10- by 30-in. in size) are filled with the gas to be tested and closed with a rubber stopper. Threshold concentrations of odors are obtained by alternately releasing portions of sample gas and diluting the residue with fresh air until the odor is just perceptible. Six or more observers are employed to obtain a reliable rating. The advantages of this method are as follow: (1) ratings need not be made at the source of the odor as the bags may be filled and transported for more than 20 mi; (2) the reliability of the rating will not be impaired by the fact that the observers have previously and at length been in contact with the odor; (3) the untreated gas can be stored for ready comparison with the odorous gas after treatment; (4) hot gases discharged from oxidation processes can be cooled to ambient temperatures before testing; (5) threshold concentrations can be determined easily; and (6) the equipment is inexpensive and portable.

58

Beckett, J. C. 1954
AIR IONIZATION AS AN ENVIRONMENT FACTOR. Elec. Eng., v. 73, Oct. 1954: 916-920.
DLC (TK1.A61, v. 73)

A correlation is made of a study of ionized air and particle size from the standpoint of health. Atmospheric ions are designated in 3 groups: (1) small ions made up of gas molecules associated with 1 ionized molecule; (2) intermediate ions formed from smoke or hydrated ions; and (3) large ions consisting of small ions surrounding a nucleus of smoke. The atmospheric ion density varies from 200 ions/cc to more than 1,000 ions/cc, with positive small ions exceeding negative small ions. Particles below 5 microns in size are known to be responsible for various pulmonary diseases since they are deposited in the air sacs of the lungs. Methods of controlling atmospheric ionization, measuring ion density, and determining particle size are discussed.

59

Beidler, L. M., 1955
and D. Tucker.
RESPONSE OF NASAL EPITHELIUM TO ODOR STIMULATION. Science, v. 122, July 8, 1955: 76. DLC (Q1.S35, v. 122)

An *in vitro* laboratory preparation of tissue of the olfactory area of the opossum was used to study the nerve response to odors such as amyl acetate, benzene, etc. . . ., as well as to mechanical stimulation. This tissue area is innervated by both olfactory and trigeminal nerve fibers. The type of stimuli to which the preparation responsed, and the slow conduction velocity of the nerves suggested that the recordings obtained were primarily from olfactory nerves. Later a laboratory preparation of a live rabbit was made in such a manner that response to odors could be recorded from the olfactory nerves as they passed through a cribriform plate. These results compared well with ones recorded from known trigeminal nerves of the same rabbit. It was concluded that the olfactory and trigeminal systems are much more similar in the type of stimuli to which they respond than was previously realized.

60

Bell, G. B., 1954
E. Robinson, and D. H. Hutchison.
METEOROLOGY IN AIR-POLLUTION ENGINEERING. Arch. Indus. Hyg. and Occupat. Med., v. 10, July 1954: 1-10, illus. (Paper presented at the Joint Meeting of the American Meteorological Society of the American Geophysical Union, Sept. 11-12, 1952, in conjunction with the Centennial of Engineering, Chicago, Ill.)
DLC (RC963.A14, v. 10)

The role of the meteorologist, and his relation to the engineer, is discussed in regard to air pollution concerning location of new construction, correction of existing problems, and tracing sources of pollution. Some data are given on the wind patterns of various areas in California including the southwestern portion of San Bernardino County and Los Angeles.

61

Benson, R. S. 1955
DISCHARGE OF GAS FROM CYLINDER TO ATMOSPHERE. I. II. III. Engineer, v. 199, Apr. 22, 1955: 546-548; Apr. 29, 1955: 582-584; May 6, 1955: 618-620. DLC (TA1.E5, v. 199)

The pressure phenomena in a cylinder discharging to the atmosphere can be explained by the normal fluid mechanic concepts of transient flow. In particular, the discharge process can be examined by a graphical solution of the basic equations, the method of characteristics. For sudden discharge from a cylinder, the magnitude of the depression increases with increasing port area, the duration of the depression increases with cylinder pressure and cylinder length. For gradual port opening, 4 distinct phases in the discharge process can be observed: (1) a short delay period corresponding to the time for the wave front to arrive at the closed end; (2) the reflection of the finite wave at the closed end; (3) the rapid fall in pressure as the ports open; and (4) the depression produced by the reflection of the wave points at the closed end. The magnitude of the depression at the end of the discharge depends only on the port area at this point. By an extension of the approximate solution, the factors affecting the port area ratio at the end of discharge and the magnitude of the depression can be calculated. The port area ratio increases with earlier port opening, release pressure, and with the product of engine speed times cylinder length. (Author's abstract in part)

62

1956
BENZOLE METER. Instrument Rev., v. 3, Apr. 1956: 101. DLC

"This meter was primarily designed to measure the benzole content of coal gas before or after stripping. Its useful range is between 0.1 and 6.0 g benzole/100 l of gas. The meter responds equally to benzene, toluene, or xylene separately. An outlet is available for a recorder which would normally be required on a gas works for process control. The instrument is also sensitive to certain other organic vapors, e.g., methyl ethyl ketone (M.E.K.), when these are passed through the ultraviolet absorption cell." (Quoted in full)

63

Besselman, W. L. 1955
INSTRUMENTATION FOR ATMOSPHERE ANALYSIS AND CONTROL. Indus. Heating, v. 22, Apr. 1955: 704-712. DLC (TH7201.I5, v. 22)

Instrumentation for continuously recording the composition of atmospheres is described. Infrared gas analyzers are used for recording the concentration of carbon dioxide, carbon monoxide, and methane with considerable accuracy. A magnetic oxygen analyzer has given accuracies to ±0.05%. Where gases are to be purified, a carbon dioxide analyzer indicated complete removal of that gas. Several other uses of gas analyzers and recorders are cited.

64

Best, G. E. 1952
A RATIONAL APPROACH TO AIR-POLLUTION LEGISLATION. Arch. Indus. Hyg. and Occupat. Med., v. 5, June 1952: 517-526.
DLC (RC963.A14, v. 6)

This is a report of the Subcommittee on Legislation Principles of the Air-Pollution Abatement Committee of the Manufacturing Chemists' Association, Inc., Washington, D. C. It was stated that legislation for reduction and control of air pollution could best be achieved by embodying the following principles: (1) creation of a state bureau staffed with technical personnel; (2) establishment of localized air-pollution zones; (3) appointment of local air-pollution control commissions for each pollution zone; (4) registration of emission sources; (5) granting of reasonable right to enter private property; (6) action by the state bureau with the consent of the local control commissions to first recommend, and then legally enforce specific requirements to achieve a particular objective; and (7) cooperation in technical advancement through the state bureau.

65

Best, G. E. 1953
A RATIONAL APPROACH TO AIR-POLLUTION LEGISLATION. (Letter to the editor). Arch. Indus. Hyg. and Occupat. Med., v. 7, Mar. 1953: 257-258. DLC (RC963.A14, v. 7)

This is a reply to T. C. Wurts' discussion (Arch. Indus. Hyg. and Occupat. Med., v. 7, Mar. 1953: 255-257) of G. E. Best's original paper (Ibid., v. 5, June 1952: 517-526). Best states that even though there may be little precedent as yet for the pollution- zone concept of control to extend outside municipal boundaries, this does not indicate its impracticability. The recommendation for local control of a pollution zone is based on the concept that the inhabitants of a zone should have the right to control it, and that commission members serving without pay would insure devotion to public interest. In order to provide the necessary technical service for local control commissions, it was suggested that these facilities be established at the state level. Also it was intended that the technical group would be empowered to request the registration of essential data about those effluents which were considered to be significant from the standpoint of air pollution; thus, the registration of every effluent would not be mandatory.

66

1955
BIG PUSH FOR CLEAN AIR. Chem. Week, v. 76, Sept. 10, 1955: 102, illus. DLC (TP1.C37, v. 76)

"Two large catalytic chambers [illustrated] will soon be joined by a third, which will employ the largest platinum alloy catalyst bed ever fabricated. Designed and built by Catalytic Combustion, they are Barrett's answer to the air-pollution problem at its Philadelphia phthalic anhydride plant. The tail gas from the operation contains traces of phthalic and maleic anhydrides along with some aldehydes and other irritating by-products. By means of a gas burner and a heat exchanger, the gas is brought up to temperature and then catalytically converted into carbon dioxide and water.

In the oxidation, the temperature is raised further so that the gas is returned to heat the incoming stream." (Quoted in full)

67

Bigg, E. K. 1956
THE DETECTION OF ATMOSPHERIC DUST AND TEMPERATURE INVERSIONS BY TWILIGHT SCATTERING. Jour. Meteorol., v. 13, June 1956: 262-268, illus. DLC (QC851.A283, v. 13)

Equipment designed to detect variations in the rate of change of illumination from a small part of the sky during twilight was used in the hope of locating layers or regions of dust particles in the atmosphere. The measurements prominently displayed dust accumulations below about 20 km, which were found to correspond very closely to the temperature inversions determined by nearby radiosonde flights. Dust near the tropopause was conspicuously revealed, and its wide variations in amount were closely correlated with the passage of weather systems. The temperature inversion near 80 km was also readily detectable, and changes in the scattering from it suggested that dust was also present there. Systematic variations from day to day appeared to be related to the advent of visually observed meteor showers and to a "world rainfall" figure. (Author's abstract)

68

Billings, C. E., 1955
W. D. Small, and L. Silverman.
PILOT-PLANT STUDIES OF A CONTINUOUS SLAG-WOOL FILTER FOR OPEN-HEARTH FUME. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 159-166, illus. (Paper presented at the 48th Annual Meeting of the Air Pollution Control Association at Detroit, Mich., May 23-26, 1955) DLC

Laboratory investigations of the resistance and efficiency of commercial spun-slag wool fibers used to filter iron oxide contained in a high-temperature gas stream (600° to 1200°F) are described. Field tests of a continuous web of slag-wool fibers used to filter open-hearth furnace fume at temperatures from 400° to 700°F are also reported. Filtration velocity in both studies averaged about 100 ft/min. Laboratory studies indicate that collection efficiencies over 90% may be obtained with 1 in. thick pads of slag wool packed to 5 and 10 lb/cu ft density. Resistances initially range from 2 to 8 in. of water, and increase 2 to 14 in. during filtration of 0.1 grain/cu ft of a fine iron oxide aerosol. Field studies of a continuous web of slag wool showed variations in efficiency from 10 to 90%. Filter resistance was maintained near 4 in. of water during operating periods ranging from 1/2 to 3 hr. A correlation between inlet fume loading and furnace production was observed which influenced filter requirements. Mechanical factors in the test unit tending to lower the efficiency of the continuous web were determined, and suitable redesign may be expected to eliminate these faults. Based on field studies, it was found that an average 250-ton hot-metal open-hearth furnace would require 1 to 3 tons of slag wool/day to filter stack gas. (Authors' abstract)

69

Bingham, F. T., 1954
and others.
FLUORINE INJURY TO CITRUS; EFFECT OF AIR POLLUTION INVESTIGATED TO LEARN EXTENT OF CONTAMINATION BY COMPONENT OF SMOG. Calif. Agri., v. 8, May 1954: 12, 15, illus. DA

Foliage from approximately 130 Calif. citrus groves was sampled for fluoride analyses. In areas considerably removed from industrial centers, the maximum level found in the foliage was seldom more than 1 ppm fluorine. In the Los Angeles area, a gradual increase in leaf fluoride concentration (as high as 57 ppm) took place with the approach to the heavily industrialized district. In the neighborhood of a steel plant near Fontana, in the San Bernardino Valley, a maximum concentration of 211 ppm fluorine was found with an average concentration of 95 ppm from 12 groves in the area. Since relatively little fluoride appears to be translocated from the soil to the foliage, and because only a small amount of fluorine was detected in foliage away from industrial areas, the very high concentrations mentioned for the 2 areas above are ascribed to airborne fluorides emitted by industrial plants. In addition to steel plants, industries concerned with the production of aluminum, ceramics, phosphates, and miscellaneous chemicals are other possible contributors of fluoride to the atmosphere. Possible impairment of fruit production or damage will be studied later, but so far there is no field evidence of leaf scorch or burn in citrus which is attributable to fluorine.

70

Blacet, F. E. 1952
PHOTOCHEMISTRY IN THE LOWER ATMOSPHERE. Indus. and Eng. Chem., v. 44, June 1952: 1339-1342. DLC (TP1.I6, v. 44)

Some of the photochemical reactions which occur in air in the presence of sunlight are discussed. Ozone may be expected as a byproduct in the photolysis and oxidation of sulfur dioxide, nitrogen dioxide, aldehydes, and ketones. Hydrocarbons, in the presence of ozone and nitrogen dioxide in the air, may form organic lachrymators as their final oxidation products.

71

Blacklock, J. W. S., 1954
and others.
THE CARBON CONTENT OF HUMAN LUNGS AND BRONCHIAL GLANDS. Unio internat. contra cancrum, acta, v. 10(2), 1954: 93-94. (Paper presented at a Meeting of the European Section of the International Union Against Cancer, London, Oct. 18-23, 1953) DNLM

Chemical estimates were made of the carbon in the lungs and bronchial glands in material obtained from hospitals in London (42 cases) and in Iceland (8 cases). Of the 26 men in the English group, 16 had bronchial carcinoma, and of the 16 women, 5 had carcinoma. In the Icelandic group of 4 men and 4 women, there were no cases of carcinoma. The mean total amount of carbon in the material from London hospitals was higher in men than in women, but the findings within the group with bronchial carcinoma were reversed. The Icelandic group, with no cases of bronchial carcinoma, showed the higher amount of carbon in the women, but this reversal of the London findings may be explained by conditions of rural life there in the recent past. A relationship was apparent between the accumulation of carbon and length of residence in London or other large cities. Using a rough estimate of 100 grams as the amount of carbon to be inspired during a lifetime in an English city, the 0.5-1.0 gram actually found in lungs and bronchial glands is a measure of the efficiency of the nasal and tracheo-bronchial mucous membranes. Based roughly on the amounts found in the suspended material in the air over various English cities, and on a life span of 70 yr, about 16 milligrams of 3:4 benzopyrene and 36 milligrams of arsenic might be inhaled, in addition to the estimated 100 grams of carbon.

72

Blasewitz, A. G., 1955
and B. F. Judson.
FILTRATION OF RADIOACTIVE AEROSOLS BY GLASS FIBERS. Air Repair, v. 4, Feb. 1955: 223-229, illus. DLC

Fixed-bed filters, formulated from fibrous glass media have been developed and selected at the Hanford Atomic Products Operation as the method best filling the requirements for the particulate decontamination of the process gas streams. The parameters affecting the dependent variables, collection efficiency, and flow resistance, have been thoroughly evaluated for the more promising glass fibers. A comparison of the useful filtration life to be expected from the various types of fibrous units has been made in a series of tests using a methylene blue aerosol. Based upon these data, plant-scale equipment, capable of operating at a higher superficial air velocity than the plant sand filters and with a greater efficiency, a lower flow resistance, and a greater life expectancy, has been designed and installed. The collection efficiency of the plant units has been determined to be 99.99%. The first fibrous glass units have been in operation for 2 1/2 yr and there have been no maintenance requirements nor any significant change in their performance characteristics. The use of glass fiber filters, of course, need not be restricted to the filtration of radioactive materials. Fixed-bed filters formulated with glass fibers can be employed advantageously whenever submicron particles, present in air streams at low concentrations, must be removed with a very high efficiency. (Authors' abstract)

73

1954
BLAST FURNACE GASES CLEANED AT EDGAR THOMSON WORKS. Blast Furnace and Steel Plant, v. 42, Aug. 1954: 937.
DLC (TN1.B7, v. 42)

Dust is removed at the Edgar Thomson Works by incorporating a dust catcher, washing towers, and an electrostatic precipitator. After about 70% of the dust is removed from the gases in the first operation, the gases pass through the washing tower at the rate of 120,000 cu ft/min. Each 90-ft tower has 6 levels of ceramic tile filters with sprays above each filter tank. The final dust removal is accomplished in an electrostatic precipitator.

74

Bleasdale, J. K. A. 1952
ATMOSPHERIC POLLUTION AND PLANT GROWTH. Nature, v. 169, Mar. 1, 1952: 376-377, illus. DLC (Q1.N2, v. 169)

Strains of rye grass (Lolium perenne L.) known as "Aberystwyth S23," and some other plant species, were grown experimentally in greenhouses in the presence of polluted air, in which the daily mean concentrations of sulfur dioxide were known, or in the presence of purified air. Treatment with purified air gave, with one exception, a dry weight considerably higher than treatment with polluted air. The polluting factor causing this effect on growth-rate is not, however, known. No sign of leaf damage could be detected in the greenhouse with polluted air; however, it is indicated that pollution decreases the growth rate even in the absence of visible leaf injury. Earlier workers had inferred that unless leaf injury was manifest there were no other deleterious effects.

75

1956
BLOOD CELL AND PARTICLE COUNTER (AUTOMATIC). Instrument Rev., v. 3, Nov. 1956: 451.
DLC

"Small particles in the range 1-100 microns often have to be counted, and in many cases separated into size groups. These particles may range from blood cells to coal dust through a wide variety of materials such as carbon, sugar crystals, bacteria, photographs of stars, etc. An instrument recently introduced is capable of dealing with a wide range of materials with only fairly small modifications to the basic design, such as different light sources, single or double variable slits, fixed slits of several types, etc. The basic principle is to reciprocate the slide through a beam of light falling on a slit behind which is a photomultiplier. The pulses produced, as particles pass through the beam, are automatically counted. As one example of its use, a count of blood cell numbers can be made in 3 min while a size distribution known as a Price Jones curve, can be made in about 50 min." (Quoted in full)

76

Blum, H. A., 1952
L. F. Stutzman, and W. A. Dobbs.
GAS ABSORPTION: ABSORPTION OF CARBON DIOXIDE FROM AIR BY SODIUM AND POTASSIUM HYDROXIDES. Indus. and Eng. Chem., v. 44, Dec. 1952: 2969-2974.
DLC (TP1.I6, v. 44)

A short history of studies on the absorption of carbon dioxide from the air by caustic solutions is presented. The present study will: (1) determine the variables affecting the transfer of carbon dioxide into the caustic solutions; and (2) correlate these variables into an effective design. Glass and steel absorption towers are diagrammed, and mathematical expressions for the gas transfer coefficient are calculated. Graphical data indicate that potassium hydroxide is a better absorber than sodium hyroxide.

77

Bobrov, R. A. 1952
THE EFFECT OF SMOG ON THE ANATOMY OF OAT LEAVES. Phytopathol. v. 42, Oct. 1952: 558-563, illus. DLC (SB599.P935, v. 42)

Smog in the Los Angeles, Calif. area causes serious damage to the oat crop. Damage depends upon the normal anatomical pattern of the parallel-veined leaf, upon the stomata as a portal of entry for the harmful elements in the air, and upon the amount of internal air space in the leaf. Initial damage may be observed microscopically as the cells directly lining the substomatal chambers shrink. As more and more cells are affected, longitudinal streaking of the leaves occurs, corresponding to the position of the stomatal zones. Ultimate browning and death of the entire blade may result. The extent of injury is in proportion to the concentration of smog in the air. (Author's abstract)

78

Bobrov, R. A. 1955
THE LEAF STRUCTURE OF POA ANNUA WITH OBSERVATIONS ON ITS SMOG SENSITIVITY IN LOS ANGELES COUNTY. Amer. Jour. Botany, v. 42, May 1955: 467-474, illus.
DLC (QK1.B345, v. 42)

Annual bluegrass (Poa annua L.) is very sensitive to certain phytotoxic agents present in smog, and might be useful as a bioassay indicator plant. In the field, the characteristic response to hydrocarbon-oxidation products is seen to be a tan spotting or transverse banding limited to the region between tip and midblade of susceptible leaves. This damage has been duplicated in the laboratory with synthetically-produced smog. In plants having a high specific sensitivity to smog, damage is correlated with stomatal distribution and activity, volume of intercellular air space, and age of cells. (Author's abstract)

79

Brasch, J. K. 1956
FREE SILICA IN INDUSTRIAL DUSTS; PHYSICAL METHODS FOR DETERMINATION. Amer. Indus. Hyg. Assoc. Quart., v. 17, Mar. 1956: 65-74. DLC

The principles and salient features of several distinctly significant physical methods for determination of free silica in industrial dusts are presented. These are of particular value in industrial hygiene because they are applicable to dusts of fine particle size, such as those from industrial atmospheres. Petrographic analysis, which in its application to industrial dusts is based mainly on determination of the optical properties of minerals, and analysis by x-ray diffraction have been best received. The latter is most prominent. Other methods employ fusion, thermal changes in crystal structure (differential thermal analysis), and sedimentation as basis for separation. Most of the methods pertain specifically to quartz and not other forms of free silica, but means are indicated whereby other forms may be determined separately or included with quartz. Weaknesses as well as advantages of the various methods are pointed out. (Author's abstract in part)

80

Breslow, L. 1955
THE EPIDEMIOLOGIST LOOKS AT SMOG. Publ. Health Rep., v. 70, Nov. 1955: 1140-1143.
DLC (RA11.B17, v. 70)

In the case of smog, the epidemiologist is given an environmental condition and asked to determine whether this causes disease. His difficulties immediately begin as he attempts to define smog, and its occurrence in time and place. In very few of the air pollution disasters has there been a convincing identification of the substances responsible. Whether or not the air pollution condition causes ill health or death must also be considered on the basis of the damage occurring within a few hr, days or even over a period of yr. Smog is a health hazard because of its interference with the physical, mental, and social well-being of people; its possible cumulative, adverse effects on health; and its disaster-making potential in case of an increase in the pollution level.

81

Brinton, H. P., 1952
and W. M. Gafafer.
THE DETROIT-WINDSOR AIR POLLUTION STUDY. STATISTICAL ANALYSIS IN AIR POLLUTION STUDIES. Publ. Health Rep., v. 67, July 1952: 661-664, illus. DLC (RA11.B17, v. 67)

The statistical approach in studying the many uncontrollable phenomena of air pollution is discussed. Some of the basic work on charting on a city map the areas of light and heavy industrial contamination is considered, together with some of the socio-economic factors, and the health of people in sample areas. Several of the variables relating weather and air pollution are also mentioned.

82

Brooks, J. D. 1956
ORGANIC SULPHUR IN COAL. Jour. Inst. Fuel, v. 29, Feb. 1956: 82-85.
DLC (TP315.I6, v. 29)

Sulfur occurs in coals in both organic and inorganic combination, but there appears to be little relationship between the 2 forms. This survey of published work indicates that the presence of organic sulfur has a marked effect upon coal properties. Coals with a high organic sulfur content tend to have a lower air - dry moisture content than low-sulfur coals of the same rank. The percentage volatile content of high-sulfur coals is virtually the same as that of their oxygen analogs; in this respect these coals behave as their carbon content suggests. Sulfur is bivalent in most of its groupings and cannot take part in the cross-linking which is the cause of the lower volatility of the higher-rank coals. Because of diminishing reserves of high-quality coking coals, it is becoming increasingly important to understand the part played by sulfur in the coking process, and to develop economical methods for reducing sulfur in coke to a tolerable level. There is a discussion of the evolution of sulfur compounds during carbonization of coal. (Author's abstract in part)

83

Brown, R. L. 1956
SOME COAL RESEARCH PROBLEMS AND THEIR INDUSTRIAL IMPLICATIONS. Jour. Inst. Fuel, v. 29, May 1956: 218-236, illus.
DLC (TP315.I6, v. 29)

By use of modern methods of experimentation, the primary characteristics of the constitution of coal are discussed in detail, under the main headings of the "coal skeleton," dust, smoke, capillary structure, physical properties, and breakage. Some of the differences in results of dust samplings under nonuniform conditions, especially of load variation, are also discussed. Smoke is formed when coal is heated relatively slowly, and the volatile products do not pass through a hot zone. Smoke is discussed in terms of the material as it leaves the external surface of the coal, with the initial material being called distillation smoke. When distillation smoke burns, a more carbonaceous particulate product is formed in the flame; some of this escapes from the flame envelope and is called flame smoke. Flame smoke is formed even from simple hydrocarbon fuels, and takes the form of giant molecules resulting from further polymerization reactions. Photographs of smoke are presented showing such a polymerization of methane during thermal decomposition at a relatively low temperature. In contrast is the photograph showing carbon particles evident as discreet entities, and forming the familiar chain structure, when decomposition took place at a much higher temperature. Distillation smoke is more largely determined by the fuel; flame smoke is dependent mainly on the availability of air for completion of combustion and only partly on the fuel. Flame smoke is also a useful constituent of flames, which derive from it most of their luminous radiation. A laboratory apparatus being developed for measuring smokiness of fuels is illustrated. (Author's abstract in part)

84

[Bryant, L. W., 1955
and C. F. Cowdrey].
THE EFFECTS OF FLUE GAS WASHING. Smokeless Air, v. 25, Spring 1955: 169. (Paper presented to the Institution of Mechanical Engineers, London, Feb. 11, 1955)
DLC (TD884.S855, v. 25)

Concerning the advantage of washing chimney effluents, it is concluded that: "(1) The loss of buoyancy of the effluent which results from washing destroys the advantage of the reduction of sulfur dioxide content at the exit so long as the turbulence of the air is less than that corresponding to a wind speed of 15 mph. (2) The advantages of washing become more pronounced as wind speed and turbulence increase. (3) With a given volume rate of discharge of the effluent gas, there is a critical diameter of exit for the stack above which the maximum concentration of sulfur dioxide is greater for the washed than for the unwashed plume. If the height of the stack is 100 ft or more this critical diameter is greater than 30 ft. (4) If the height of the stack is not less than 200 ft, the greatest concentration of sulfur dioxide anywhere on the ground will not exceed 1/1000 of the concentration at the exit if the effluent is unwashed so long as the speed of the wind is not much above 20 mph. (5) Maximum concentration occurs much nearer the stack when the effluent is washed than when unwashed. (6) When washing is decided upon, the exit velocity of the effluent gas should be as high as possible. (7) When it is necessary to consider concentrations at a level comparable with the height of the chimney, it will be found that they are notably greater than concentrations on the ground for a stack 50 ft high, and that they are very little altered by variations of stack height. (8) When a power station is situated in a built-up area with buildings of very uneven height, or in a countryside of a hilly nature, it is suggested that a model test is invaluable to determine the course of the smoke plumes as influenced by the local topography." (Quoted in part)

85

Bureau of Mines. 1956
SECTION I. EXPERIMENTAL STUDY INCINERATION. [1956], p. 1-7, tables. (In its: Annual Rep. for the Fiscal Year 1956, and Rep. for the Quarter Ending June 1956, June 30, 1956, Air Pollution Control Project 1881-782-A) TID

Information on the various factors involved in the design and operation of incinerators was obtained using a furnace with grate area of 0.5 sq ft and an air rate of 84 cu ft/min. Two standard charges, composed of leafy vegetables, wood chips, cardboard, newspaper, and magazines, and having moisture contents of 25% and 50%, were used for test purposes. To facilitate the preparation of the charges, 5 methods of moisture determination were checked; the toluene distillation process appeared to be most suitable. Thirteen organic compounds, in 40 experiments, were passed through thermal destruction apparatus to obtain information about the destruction of organic compounds in afterburners of commercial incinerators. The concentration of contaminant ranged from 6 to 95 ppm, the oxygen concentration from 1 to 3%, and the temperature from 428° to 1202°F; the linear flow rates were approximately 20 ft/sec. The odor and concentration of straight chain organic compounds were considerably diminished or completely removed.

86

Bureau of Mines. **1956**
SECTION II. ENGINEERING EVALUATION OF PROCESSES FOR SULFUR DIOXIDE REMOVAL. [1956], p. 8-14, tables. (In its: Annual Rep. for the Fiscal Year 1956, and Rep. for the Quarter Ending June 1956, June 30, 1956, Air Pollution Control Project 1880-785) TID

Flue gases resulting from the combustion of coal contain about 0.06% sulfur dioxide for each percent of sulfur in the coal. Sensitive plants may be damaged by concentrations exceeding 0.25 ppm. Sulfur dioxide is known to be a respiratory irritant, and at a concentration of 0.001% produces coughing. Methods which may serve to reduce the sulfur dioxide content of stack gases include coal preparation treatments and pretreatments. The cost of sulfur dioxide removal by industrial processes ranges from 1 to 2 dollars/ton of coal consumed.

87

Bureau of Mines. **1956**
SECTION III. ENGINE EXHAUST GAS ANALYSIS. [1956], p. 15-18. (In its: Annual Rep. for the Fiscal Year 1956, and Rep. for the Quarter Ending June 1956, June 30, 1956, Air Pollution Control Project 1877-215-A) TID

Exhaust gas studies have been concentrated in 3 fields: (1) the development of chromatographic separations; (2) techniques to handle exhausts to assure maximum collection of the exhaust materials with a minimum of contamination; and (3) development of a test engine simulating operation under road conditions. The most suitable technique for sampling appeared to be the concentration of the products in a liquid air trap followed by isothermal distillation of the condensed material.

88

1956
[Bureau of Mines.] Div. of Solid Fuel Tech., Bruceton, Pa. **THE CHEMISTRY OF SULFUR DIOXIDE**, by D. Bienstock, and E. M. Murphy. Interim rept. [1956], 58p. incl. tables, diagrs. 84 refs. TID

The contamination of the atmosphere by sulfur dioxide, whether formed in dilute concentrations of 0.05 to 0.25% in the flue gases of power plants or as much as 5 to 10% in the roaster gases of smelting plants and waste gases of sulfuric acid plants, has been a public health problem for many years. The Bureau of Mines is currently engaged in a cooperative project with the US Public Health Service directed toward development of processes for treating such effluents to minimize their noxious and toxic properties by removal of the sulfur dioxide. One phase of this investigation involves a compilation of published information relating to the chemistry of sulfur dioxide, emphasizing reactions having potential application to the problem. Reactions involved in some gas-purification processes have been reviewed with no effort being made to evaluate the material which is presented to serve as an annotated bibliography. (Authors' abstract)

89

Burke, T., **1955**
O. Carm, and P. J. Nolan.
NUCLEUS CONTENT OF AIR IN OCCUPIED ROOMS. Geofis. pura e appl., v. 31, May-Aug. 1955: 191-196. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) DGS

Experiments using condensation nuclei counters to determine the relation between indoor and outdoor concentrations of nuclei, and the direct production or removal of nuclei by human occupancy are described. It was concluded that: when indoor contamination is absent, room nuclei are atmospheric nuclei which have entered by diffusion or by flow of air through small openings. A great increase in outdoor concentration will tend to be followed in a short period by an increase indoors; however, a great decrease brought about outdoors by a change in wind direction may not be paralleled by a decrease indoors. Breathing did not produce nuclei, and no change in nucleus concentration was observed which could be attributed to occupancy of the room. Although the decrease in small ion concentration without an increase in nucleus content might be explained on the basis of humidity changes, it is felt that the assumed change in relative humidity (60 to 90%) is not very likely to occur.

90

Burnside, W., **1956**
W. G. Markseil, and J. M. Miller.
THE INFLUENCE OF SUPERHEATER METAL TEMPERATURE ON THE ACID DEW-POINT OF FLUE GASES. Jour. Inst. Fuel, v. 29, June 1956: 261-269, illus. DLC (TP315.I6, v. 29)

A description is given of experiments carried out in a gas-fired pilot-scale unit to study the change in the acid dew-point of flue gases passing through a bank of superheater tubes when the tube metal temperatures were varied from 850° to 1250°F. Two techniques were used: the concentration of sulfur trioxide in the flue gases was determined by chemical analysis, and the dew-point was measured directly with an external dew-point probe above and below the tube bank. The experimental results indicate that increases in dew-point up to 20°F can occur with metal temperatures around 1200°F; the effect is considerably less with metal temperatures in the range 1000° to 1100°F. During the course of the investigation a relationship between the acid dew-point and the sulfur trioxide concentration in the flue gas was established. This relationship is compared with the results of other investigators. (Authors' abstract)

91

Bush, A. F. 1957
STRANGE AIRBORNE PARTICLES. Arch. Indus. Health, v. 15, Jan. 1957: 1-2, illus.
DLC (RC963. A14, v. 15)

Two electron micrographs of air samples are shown, the first representing the typical particulate material in air collected in the Los Angeles Basin (Calif.), and the other representing an unusual type of needle and flake material obtained while sampling on a 24-hr basis between June 6 and July 6, 1956. The latter samples were taken on the seventh floor of a downtown Los Angeles building at 3 different points, one outside the building, one in a room where the air was filtered through activated carbon, and one in a room with no air filtration. The needles and flakes appeared in both night and day sampling, in the outside air sampling, and most of the time in the inside air sampling during this period.

92

Cadle, R. D., 1953
A. G. Wilder, and C. F. Schadt.
TECHNIQUE FOR COLLECTING, MOUNTING, AND SECTIONING AIRBORNE PARTICULATE MATERIAL. Science, v. 118, Oct. 23, 1953: 490-491.
DCU

A technique is described for the microscopic examination of airborne particles. Particles are collected on cellulose acetate-cellulose nitrate filters. The filters are rendered transparent by mounting in methyl methacrylate at 150°C and 6000 lb/sq in. pressure. Grinding and polishing prepares the sample for photographic and microscopic examination. The advantage of this method over earlier filtration methods is that recovery of the sample is quantitative, and it is sectioned.

93

Cadle, R. D., 1955
and E. J. Wiggins.
DIRECT PHOTOMICROGRAPHY OF AIRBORNE PARTICLES. Arch. Indus. Health, v. 12, Dec. 1955: 584-591, illus. DLC (RC963. A14, v. 12)

Equipment has been developed which makes possible the photomicrography of airborne particles without removing the particles from the air. It is especially useful for particles in the range of 2 to 100 microns in diameter. Objective lenses with theoretical limits of resolution as low as 0.35 micron, however, have been used successfully. The apparatus and methods for its use are described.

94

Campbell, J. M. 1954
IMPROVED COMBUSTION HELD AID TO AIR POLLUTION ABATEMENT. S.A.E. Jour., v. 62, Dec. 1954: 54-58. DLC (TL1. S5, v. 62)

Air pollution from fuel exhausts indicates a waste of fuel because of inefficient combustion. Gasoline engines discharge carbon monoxide in amounts up to 12% of the total exhaust gases, hydrocarbons, and oxides of nitrogen and sulfur emitted. Diesel engines contribute smoke and odor. All contaminants from exhausts, however, represent only 1% by volume which is below the level for acute poisoning. One hundred fifty-six traffic officers from the Holland Tunnel in New York City, who were exposed to carbon monoxide concentrations of 70 ppm daily for 13 yr, showed no evident health impairment. It was pointed out that pyrene, benzopyrene, and anthranthrene may be conducive to cancer when present with soot. Only 1 part exhaust gas/2000 parts of air was measured in downtown Los Angeles, Calif. during a heavy smog, far below the maximum amount that can be tolerated. Vegetation, contaminated by ozone in the Los Angeles area, showed a spotting on the underside of the leaf, called silver leaf. Graphical data indicated that carbon monoxide and total exhaust gases discharged from cars have been reduced 1/2 and 1/3, respectively, since 1927. In regard to smoke abatement, the Vehicle Combustion Products Subcommittee [Society of Automotive Engineers] recommended that: (1) exhaust composition be studied; (2) maintenance and repairs be made on automobiles to reduce visible exhaust; (3) devices be designed to reduce unburned fuels; and (4) facts be correlated concerning the pollution caused by automotive equipment.

95

1956
CANCER AND AUTO FUMES. Chem. and Eng. News., v. 34, June 11, 1956: 2866-2867.
DLC (TP1. C35, v. 34)

Tumor incidence from gasoline engine exhaust gases (I), coal soot (II), oil soot (III), and diesel engine exhaust gases (IV) is given from results of a controlled experiment. Extracts (benzene soluble) of these 4 common air pollutants were applied to mice twice a week for 2/3 of a yr. The following results were obtained:

I 76% developed tumors
II 1 tumor induced in 36 mice
III no tumors
IV no tumors

96

Cann, G. R., 1954
W. M. Noble, and G. P. Larson.
DETECTION OF SMOG-FORMING HYDROCARBONS IN AUTOMOBILE EXHAUST GASES USING PLANTS AS INDICATORS. Air Repair, v. 4, Aug. 1954: 31-34. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Crop-damaging hydrocarbons which produce the same effect as smog are present in automobile exhaust gases. In the presence of ozone, auto exhaust fumes dilated 1:116 produced typical damage to the 5 smog-indicator plants (spinach, oat, sugar beet, endive, and alfalfa). Comparison with gasoline indicated that hydrocarbons from automobile exhaust gases are at least equally as effective as gasoline in producing typical smog damage on the 5 indicator plants. Because of the significance of the findings expressed in this report, the Los Angeles County Air Pollution Control District is continuing investigations to determine the impact of the total contribution of exhaust gases to the air pollution effects found in the community. (Authors' abstract)

97

Carpenter, S. B., 1956
and R. E. Sparkman.
ADAPTATION OF TITRILOG FOR FIELD MOBILE SAMPLING. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 195-196, illus. DLC

A portable Titrilog was used in order to study the diffusion of sulfur dioxide in stack gases. Methods of installation and operation of the Titrilog in a car and in a helicopter are described. The method of calibrating the equipment using sulfur dioxide gas is also described.

98

Castrop, V. J., 1955
J. F. Stephens, and F. A. Patty.
A COMPARISON OF CARBON MONOXIDE CONCENTRATIONS IN DETROIT AND LOS ANGELES. Amer. Indus. Hyg. Assoc. Quart., v. 16, Sept. 1955: 225-229, illus. DLC

Air sampling for carbon monoxide content was done from an automobile travelling in traffic of varied density in both Detroit and Los Angeles. The probe used for sampling was located over the right fender approximately 2 ft in front of the windshield. This port of entry was chosen approximately 5 ft above street level to simulate the breathing zone height of pedestrians at the curb. Air passed through the probe to a carbon monoxide indicator located inside the car. Samples were also collected about 150 ft above the street. Test data from both cities, when compared with the findings from earlier reports, support the conclusions that increased usage of automobiles has not increased the hazard of atmospheric carbon monoxide.

99

Chambers, H. H. 1954
and R. G. Wall.
CENTRIFUGAL GAS ABSORBERS. Chem. Trade Jour., v. 134, Apr. 16, 1954: 959-960.
DLC (HD9650.1.C5, v. 134)

An experimental model of a centrifugal absorber equipped with a set of stationary rings intermeshed with a set of rotary rings over which a liquid is sprayed, was tested with an air mixture containing 10-15% carbon dioxide, using monoethanolamine as the absorbent liquor. The absorber was capable of treating 21,500 cu ft/hr of air, reducing the carbon dioxide content to 2.5%, and consuming 225 gal/hr of the absorbent. Experimental results indicated that the efficiency increased with an increase in the temperature of the liquid, and that the curtain of spray formed was the main medium of absorption.

100

Chambers, L. A. 1954
FILTER MEDIA FOR AIR SAMPLING. Amer. Indus. Hyg. Assoc. Quart., v. 15, Dec. 1954: 290-296. (Presented at the National Symposium on Instrumentation for Industrial Hygiene conducted by the School of Public Health, University of Michigan, Ann Arbor, Mich., May 27, 1954) DLC

Those filter media which function wholly or in part by mechanical screening, such as materials of granular, fibrous, or gel structure are discussed. It is concluded that there is no single material which will meet the technological requirements of all analytical procedures. Variations of the conditions of air velocity, humidity, etc., must be considered as well as the purpose for which the sampling is being done, the nature of the substance being collected, and the chemical properties of the filter media. Further development of the theory of filtration, especially with respect to electrostatic phenomena, will aid in the choice of the filter media.

101

Chandler, J. M. 1955
BETTER INSTRUMENTATION NEEDED TO DETERMINE EXHAUST GAS COMPOSITION. S.A.E. Trans., v. 63, 1955: 618. DBS

A brief discussion is given of the activity at Ford [Motor Co.] Engineering in the field of exhaust gas and air pollution. The need is stressed for a highly accurate exhaust-gas analysis which will identify all of the products, and for a simple, rugged, quick-responding analyzer. In engine tests, a marked reduction in the emission of unburned fuel during deceleration was obtained by eliminating fuel flow throughout most of the deceleration cycle.

102

Chanin, G., 1954
J. R. Elwood, and E. H. Chow.
A SIMPLIFIED TECHNIC FOR ATMOSPHERIC H_2S STUDIES. Sewage and Indus. Wastes, v. 26, Oct. 1954: 1217-1230, illus.
DLC (TD511. S4, v. 26)

A relatively simple method, which consists of exposing specially prepared lead acetate test tiles and noting the degree and rapidity of blackening, for use in atmospheric hydrogen sulfide pollution studies is described. Use of this method permits sampling of a large area in a short time with a minimum of manpower and equipment. Some specific applications of the technic, especially in the San Francisco Bay, Calif. area, are described. (Authors' abstract in part)

103

Chapman, H. M. 1953
DUST COUNTING BY THE MOST PROBABLE NUMBER METHOD. Arch. Indus. Hyg. and Occupat. Med., v. 8, Sept. 1953: 234-245, illus.
DLC (RC963. A14, v. 8)

A test-tube method for estimating bacterial pollutions, known as the most probable number method, was applied to the counting of dust samples, using each square on the Whipple disk as a unit. Only the squares in which there are no particles need be counted. Dilutions of the dust sample were made to give an estimated 15 to 25 squares free of particles per 100 squares, which was equivalent to 555 to 760 particles/cc. Counts by this method and by the standard method, made on the same test sample, were very similar as to number and reliability; however, the most probable number method required only one half to one third the time of the standard method. The mathematical derivation of the new method, as applied to dust counting, is given.

104

1955
CHART FOR JUDGING SMOKE DENSITY. Gas World, v. 142, Sept. 10, 1955: 611.
DLC (TP700. G2, v. 142)

The history of the first Ringelmann Smoke Chart, named for Professor Maximilien Ringelmann of Paris, and its introduction into the United States are discussed. Some of the features and uses of the chart are also described.

105

1953
CHEMICAL WATCHBIRDS. Indus. and Eng. Chem., v. 45, Mar. 1953: 17A-18A.
DLC (TP1. I6, v. 45)

The development of carbon-monoxide and sulfur-dioxide detectors, in the form of silica gel impregnated with color indicating complexes, is discussed. Vanadate-impregnated gels detect sulfur dioxide concentrations up to 120 ppm by changes from bright yellow to dark green, while potassium periodate detects concentrations up to 675 ppm as the gel changes from white to pink. Although little is known about the reaction itself, quantitative measurements are determined by reference to standard colors.

106

Chen, C. Y. 1955
FILTRATION OF AEROSOLS BY FIBROUS MEDIA. Chem. Rev., v. 55, June 1955: 595-623.
DLC (QD1. A5635, v. 55)

The removal of aerosol particles from a gas stream is considered with regard to the collection efficiency of a cylindrical collector, and the relationships governing filtration by fibrous media. Mathematical expressions are given for the collection of particles by these methods: (1) inertial impaction; (2) direct interception; (3) settling; (4) inertia and interception; and (5) diffusion and interception. The neighboring fibers in a filter affect its collection efficiency, as do the velocity and particle size. The pressure drop across a porous bed can be explained by the channel theory or the drag theory, however, the latter is more applicable to highly porous media. Graphs and tabular data are presented for the experimental results.

107

Chen, W. L., 1952
R. J. Foresti, Jr., and H. B. Charmbury.
GENERATION AND TYNDALLMETRIC MEASUREMENT OF DUST CLOUDS. Indus. and Eng. Chem., v. 44, May 1952: 1171-1174, illus.
DLC (TP1. I6, v. 44)

A dust generator, capable of producing uniform clouds with particles in the size range of 1-30 microns, is diagrammed and described. The dust is placed in dispersion by sonic vibration and then carried from the generator by an air current of 0.4-1.3 cu ft/min. The concentrations of dust, changed by varying the current input to the generator, the vibration frequency, the airflow rate, and the weight of dust placed in the generator, are plotted against these variables. Particles in the dust cloud may be evaluated by measuring the light scattered at 90° to the incident beam. The light scattering is a function of the surface area until multiple scattering occurs. (Authors' abstract in part)

108

1955
CHICAGO AIR POLLUTION. Safety Maintenance and Production, v. 109, Apr. 1955: 54 DA

The Midwestern Air Pollution Prevention Association announced a 2 year research program to determine the underlying causes of air pollution in

Chicago. The Armour Research Foundation recently completed, for the Association, a $20,000 program which included a partial statistical survey of smoke violation reports and a limited analytical study of settled dust. It was estimated that a half billion lb of dust fall on Chicago each year. Of this, approximately 45% is wind-generated, 45% is combustion dust, and 10% comes from industrial operations.

109

Cholak, J., 1952
L. J. Schafer, and R. F. Hoffer.
RESULTS OF A FIVE YEAR INVESTIGATION OF AIR POLLUTION IN CINCINNATI. Arch. Indus. Hyg. and Occup. Med., v. 6, Oct. 1952: 314-325. DLC (RC963.A215, v. 6)

A discussion, with graphs and tables, of the nature and quantity of some of the pollutants in the air is presented. Using standard air sampling equipment, samples of the air were taken several times a month for 5 yr at various stations throughout the city and its suburbs. The quantities of settled dust, suspended matter, and various gases were compared, by use of graphs, on the basis of the seasons of the year and the section of the city in which the sample was taken. Dusts counts indicated that most of the suspended particles were less than 2 microns in diameter. The increased amount of sulfur dioxide in the air during the cold months was attributed to the increased use of domestic fuels. The frequency in which different concentrations of carbon monoxide were measured is tabulated.

110

Cholak, J., 1955
L. J. Schafer, W. J. Younker, and D. Yeager.
AIR POLLUTION IN A NUMBER OF AMERICAN CITIES. Arch. Indus. Health, v. 11, Apr. 1955: 280-289. DLC (RC963.A14, v. 11)

The present method most used with continuous recording equipment for determination of ozone (oxidant) in air sampling depends on the measurement of the amount of iodine liberated by ozone from a buffered potassium iodide solution. The presence in the air of either chlorine or nitrogen dioxide causes the instrument to record increased concentrations of oxidant; the occurrence of sulfur dioxide causes serious reductions in the recorded value. Tabular data are given for concentrations of oxidant and sulfur dioxide (the latter being estimated by several methods) in air samplings which were taken in 10 American cities. Although some basic comparative information concerning probable maximum concentrations of oxidant can be obtained, methods currently used lack specificity both for determination of oxidant and sulfur dioxide. The analytical methods and their limitations should be considered if such data are to be used comparatively.

111

Cholak, J., 1956
L. J. Schafer, and D. W. Yeager.
THE CONCENTRATION OF OZONE IN THE ATMOSPHERE OF CERTAIN AMERICAN CITIES. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 227-232, 248. (Presented at the 20th Midyear Meeting of the American Petroleum Institute's Division of Refining, St. Louis, Mo., May 10, 1955) DLC

The determination of oxidant (ozone) in the atmosphere of 10 eastern and midwestern American cities by the method used in the Los Angeles area demonstrates that the oxidant concentration varies inversely with the concentration of sulfur dioxide present in the atmosphere. The levels of concentration of oxidant were generally low. The levels of concentration of the oxides of nitrogen found in these observations bear no demonstrable relationship to the density of motor traffic. The levels of concentration of carbon monoxide in the atmosphere appeared to vary with the density of motor traffic. The concentration (carbon monoxide) during the day generally reached its peak during the period of maximum traffic, but on other days it remained at a uniform level (whether high or low) throughout the entire day. (Authors' abstract in part)

112

Clamann, H. G. 1953
THE PNEUMATIC REFRACTOMETER A CONTINUOUS FAST RECORDING GAS ANALYZER. Instruments, v. 26, May 1953: 740-742.
DLC (TA165.A2, v. 26)

The refractive index of a pure gas varies with its density or, in a mixture of gases with components of different refractive indices, with its concentration. The gas mixture to be analyzed (by the pneumatic refractometer) is forced by constant flow to form a well defined band imbedded in a suitable reference gas. A light beam passing from the reference gas into the analyzed gas is refracted according to changes in its composition, therefore more or less spread out, thus changing the brightness of an image. These changes are transmitted by photocell and amplifier to an indicating or recording device. (Author's abstract)

113

Clayton, G. D. 1952
THE DETROIT-WINDSOR AIR POLLUTION STUDY: OBJECTIVES OF THE DETROIT-WINDSOR AIR POLLUTION STUDY. Publ. Health Rep., v. 67, July 1952: 658-661, illus.
DLC (RA11.B17, v. 67)

The Technical Advisory Board on Air Pollution, established by joint agreement between the United States and Canada, decided that the area to be studied would stretch from Peach Island at the north end of the Detroit River to Grosse Ile, Mich.

at the south, extending 15 miles inland on each side of the river. The study will include: (1) determination of sources, nature, and amounts of atmospheric contaminants resulting from combustion of fuels, with one of the foremost problems for study being that of smoke emission from vessels on the river; (2) determination of sources, nature, and amounts of atmospheric contaminants resulting from industrial processes; (3) determination of the effects of meteorological factors in the areas on the dissemination and diffusion of atmospheric contaminants; (4) determination of the effect of atmospheric contaminants upon health, vegetation, safety, and economy; and (5) determination of the necessary controls and their cost.

114

Clayton, G. D., 1955
J. R. Arnold, and F. A. Patty.
DETERMINATION OF SOURCES OF PARTICULATE ATMOSPHERIC CARBON. Science, v. 122, Oct. 21, 1955: 751-753, illus.
DLC (Q1.S35, v. 122)

The carbon-14 assay of samples of air, collected at one location in Detroit and one location in Los Angeles, was measured by a liquid scintillation method. The half life of carbon-14 (about 5600 yr.) insures that no activity remains in the carbon of fossil fuels, and it has been shown previously that biological materials contain an almost exactly constant proportion of radioactive carbon-14 relative to their normal carbon. The tests conducted proved the effectiveness of the technique used, and reveal that this procedure is a useful tool in determining whether or not the atmospheric carbon is newly formed, as from rubbish burning, or is aged as from petroleum, gas, and coal sources. (Authors' abstract in part)

115

Clayton, G. D., 1955
J. R. Arnold, and F. A. Patty.
PARTICULATE ATMOSPHERIC CARBON; A METHOD FOR THE DETERMINATION OF SOURCES. Amer. Indus. Hyg. Assoc. Quart., v. 16, Dec. 1955: 293-295, illus. DLC

Air samples were taken at one location each in Los Angeles and in Detroit. In Los Angeles both series of samples were obtained during a period of fog and severe haze; in Detroit, haze, smoke and fog were moderately light. Carbon was found to be a minor constituent, only about 20% of the total weight, of the total particulate matter in either location. The test was founded on the basis that all biological materials contain an almost constant proportion of radioactive carbon to normal carbon, whereas older carbon sources contain decreasing amounts of radioactive carbon. The C^{14} assay of these samples was measured by a liquid scintillation method, after conversion of the sample carbon into a liquid hydrocarbon. By use of the test, it was possible to determine whether or not the atmospheric particulate carbon was newly formed (contemporaneous), as from burning rubbish, or was aged (fossil), as from petroleum, coal, or gas sources.

116

Clayton, T. M. 1953
COMMENTARY UPON SMOKELESS ZONES. Gas World, v. 138, Oct. 24, 1953: 1043.
DLC (TP700.G2, v. 138)

A short history of legislation providing for smoke abatement is given. The smokeless zone in Coventry, England is to be enlarged to provide more freedom from atmospheric pollution. It is possible to achieve 25-30% smoke reduction at the center of a sq-mi smokeless zone; however, "impressive pollution reductions can only be achieved by a practical application of the smokeless principle to very large areas." In Salford, England legislation provides financial assistance for domestic adaptation of smokeless fuel-burning appliances.

117

1955
THE CLEAN AIR BILL. Gas World, v. 141, Feb. 12, 1955: 427-429. DLC (TP700.G2, v. 141)

The 5 main provisions of the Clean Air Bill are enumerated, and commentary is given on some of the difficulties which have risen since this bill was introduced. There is concern over the source of solid smokeless fuels, since coke seems to be the only fuel capable of meeting government specifications, and the supply is limited. The expense of installing smokeless appliances may be met in part by a £10/house government subsidy. It is pointed out that medical science still does not know what there is in pollutants that causes illness; how detrimental to health exhaust fumes from motor vehicles are; or what can be done to remove the oxides of sulfur from the air? Some authorities are of the opinion that the permissible sulfur dioxide concentration in the atmosphere should not exceed 10 ppm.

118

1955
THE CLEAN AIR BILL. Chem. Age, v. 73, Oct. 8, 1955: 771-772. DBS

This comment on the bill points out that smoke emission, as well as the emission of noxious or offensive gases, is now brought into the responsibility of the older Alkali Act. The powers and scope of the Alkali... Works Regulation Act Inspectorate are enlarged, but it appears that application of the changes will depend on local authorities' attitudes. Charges of smoke nuisance against neighbors and dark smoke offenses can be made under the 1936 Public Health Act, but local authorities must obtain the consent of the Minister.

119

1956
THE CLEAN AIR BILL; A DESCRIPTIVE SYNOPSIS. Smokeless Air, v. 26, Summer 1956: 242-251, illus. DLC (TD884.S855, v. 26)

This is a descriptive synopsis of the Clean Air Bill in the form it went from the House of Commons to the House of Lords. The various sections deal with dark smoke, smoke from furnaces, grit and dust from furnaces, smoke control areas, adaptation of fireplaces, smoke nuisances, and special cases of smoke emission (e.g., special processes to be under the Alkali Act, colliery spoilbanks, railway engines, vessels, and crown premises). The Bill provides for the appointment of a Clean Air Council for England and Wales, as well as a similar Council for Scotland. Miscellaneous provisions affect building bylaws, research and publicity, disclosure of information, penalties, enforcement, notification of offenses, and interpretation.

120

1956

THE CLEAN AIR BILL; AMENDMENTS SUGGESTED OR SUPPORTED BY THE SOCIETY. Smokeless Air, v. 26, Spring, 1956: 160-162, 163.
DLC (TD884.S855, v. 26)

The principal amendments suggested or supported by the Executive Council of the National Smoke Abatement Society (Gt. Brit.) are published as a record of the conclusions reached after the Clean Air Bill had been studied by the Technical Committee and the Council itself. Later amendments are also included which probably will have the Council's support. Equipment to arrest grit and dust; smoke control areas; and smoke nuisances were considered. The Society urged and supported the addition to the Bill of further clauses covering the following matters: Clean Air Council; annual report of local authorities; training and certification of furnace operators; height of chimneys; and sulfur fumes.

121

1955

THE CLEAN AIR BILL: AN OUTLINE OF ITS PROVISIONS. Smokeless Air, v. 25, Autumn 1955: 18-21. DLC (TD884.S855, v. 25)

The Clean Air Bill follows very closely the recommendations of the Beaver Report. Its explanatory memorandum indicates that its 4 main purposes are: (1) to prohibit the emission of dark smoke from chimneys, railroad engines, and vessels, subject to certain qualifications; (2) to prohibit the installation of new industrial furnaces unless they are capable, so far as practicable, of being operated without emitting smoke; (3) to require that the emission of grit and dust from existing industrial furnaces shall be minimized, and the new industrial furnaces burning pulverized fuel or large quantities of other solid fuel shall be provided with grit-arresting equipment; and (4) to empower local authorities, by order, subject to confirmation by the Minister concerned, to declare "smoke-control areas," in which the emission of smoke from chimneys will constitute an offense. The principal provisions of the bill are described. This bill will apply to Scotland as well as to England and Wales, but not to Northern Ireland.

122

1955

CLEANING GASES. Indus. Chemist, v. 31, Dec. 1955: 625. DLC (TP1.I62, v. 31)

The standard multiwash collector type "HC" is used where the highest possible efficiency of dust extraction is necessary, and where a large percentage of the dust falls in the submicron range. It consists of a cylindrical tower containing 6 1/2 shelved impingement stages, each comprising a horizontal disc, from which curved vanes or baffles are suspended. An entrainment separator, similar in construction to the vaned impingement stage, is placed above the foregoing units. The tower terminates in a cone at the bottom above which the dust, odor, or fume-laden air enter tangentially through ducts. The cone-shaped bottom serves as a wet cyclone, collecting the heavier particles as soon as they enter the tower. The washing agent, usually water, is introduced at no head pressure above the center of the top impingement plate. (Quoted in part)

123

1956

CLEANING UP THE AIR. Air Conditioning, Heating, and Ventilating, v. 53, Jan. 1956: 86, 87, and 128.
DCU

The background and problems pertaining to the Clear Air Bill, which is currently before the British Parliament, are presented. The bill is directly concerned with the occurrence of smoke, ash, and grit in the atmosphere. Local smoke problems will be settled by local authorities. The bill is primarily concerned with the technically backward industries that employ hand-fired boiler plants. Legislators and others maintain that an adequate method of smoke and dust assessment is essential. Studies concerning the factors responsible for smoke reduction in central heating boilers, e.g., sufficient air for combustion and adequate turbulence of air and other gases, are reviewed. Also discussed is the air pollution problem resulting from the use of inadequate filters in small to medium height chimneys -- a problem not associated with power stations having tall chimneys.

124

1956

CLEARING THE AIR. Chem. and Eng. News, v. 34, Aug. 20, 1956: 4096, illus.
DLC (TP1.C35, v. 34)

A unit to burn waste gases and collect their heat to generate steam for fuel is pictured. The eliminator consists of a catalyst chamber in which the waste gases and natural gas are mixed and burned, a waste gas cooler boiler in which the hot gases are cooled and their heat collected as steam, and an exit for the purified gases which pass to an expander. Some of the catalysts used are platinum, rhodium, palladium, and nickel. One unit can purify the gases from a 250-ton/day nitric adsorption column. The typical requirements of the unit are tabulated.

125

Cleeves, J. C. 1953
THE GENERAL ASPECTS OF GRIT AND DUST COLLECTION FROM INDUSTRIAL CHIMNEYS. Jour. Inst. Fuel, v. 25, Jan. 1953: 323-327; 332, illus. DLC (TP315.I6, v. 25)

The application of various types of dust collectors to the important problem of the elimination of dust and grit from the flue gases of industrial chimneys is described. Settling chambers, impingement-type collectors, electrostatic precipitators, filters, centrifugal or cyclonic collectors, including the conventional cyclone, combined induced-draft fans and dust collectors, and the multitubular or multicyclone type collectors are discussed. The physical principles involved, however, are not considered, attention being confined to the choice of a collector for use in a majority of industrial establishments.

126

Clelland, D. W., 1952
W. M. Cumming, and P. D. Ritchie
PHYSICOCHEMICAL STUDIES ON DUSTS. I. A HIGH-SOLUBILITY LAYER ON SILICIOUS DUST SURFACES. Jour. Appl. Chem., v. 2, Jan. 1952: 31-41, illus. DLC (TP1.S612, v. 2)

The effect of pretreatment with various salt solutions, acids, and buffers (pH 2-11) on the solubilities of 5 silicious dusts (rock crystal, silica sand from Lochaline, fuzed amorphous silica, olivine, and orthoclase feldspar) has been investigated in an effort to obtain more information on silicosis, an industrial disease caused by the inhalation of airborne silica dust. Evidence is cited for the existence of silicious dusts having a high-solubility surface layer which has not previously been investigated systematically.

127

Clelland, D. W., 1952
and P. D. Ritchie.
PHYSICOCHEMICAL STUDIES ON DUSTS. II. NATURE AND REGENERATION OF THE HIGH-SOLUBILITY LAYER ON SILICIOUS DUSTS. Jour. Appl. Chem., v. 2, Jan. 1952: 42-48, illus. DLC (TP1.S612 v. 2)

It is shown that the high-solubility layer previously demonstrated on silicious dust-particle surfaces is not a surface layer of hydrated silica; and evidence is cited that it is a vitreous silica layer of the Bielby type, formed during the production of the dust by crushing and grinding. The change of densities of quartz, vitreous silica, and agate, with silica modifications has been detected by differential thermal analysis. (Authors' abstract in part)

128

1954
COAL RECOVERY, FLY ASH REMOVAL WITH CENTRAL VACUUM SYSTEM. Utilization, v. 8, Aug. 1954: 29, illus. DLC (TP315.U85, v. 8)

A central vacuum system is described and illustrated which cleans out collected fly ash from boilers during maintenance shut-downs and also in cleanup of dirt and soot around boiler rooms in plants manufacturing paperboard and other paper products. The same central vacuum unit is used to recover fine coal which slips through the 21-ft wide chain grates of 4 large stoker-fired boilers. The system is said to be cleaner and considerably more convenient than the earlier, manual, methods used. In addition the labor saving is considerable, and the system has paid for itself after 2 yr of operation.

129

Cohen, L., 1955
and N. W. Luft.
COMBUSTION OF DUST LAYERS IN STILL AIR. Fuel, v. 34, Apr. 1955: 154-163. DLC (TP315.F7, v. 34)

Experiments on the burning of layers of dust in still air show that 3 main types of combustion may be distinguished: (1) smouldering in layers; (2) a flame in the gas phase above the layer which melts during the combustion; and (3) a flame in the gas phase above the layer which decomposes. The effect on the combustion velocity of the depth of the layer, and the particle size has been investigated. The most characteristic type of combustion exhibited concerned smouldering in the solid state, for which a tentative theoretical analysis is presented. (Authors' abstract in part)

130

1955
COMBATING ATMOSPHERIC POLLUTION. Chem. Age, v. 73, Oct. 22, 1955: 899-900. DBS

The construction and operation of the standard Holmes-Schneible Multiwash Collector Type HC is described. It is used for high efficiency dust extraction where a large percentage of the dust is of submicron size. The collector is a cylindrical tower having a cone-shaped bottom which serves as a wet cyclone. The heavier particles are collected as they enter the tower from the dirty-air inlet at the bottom of the tower. The washing agent, water or an alkaline solution to react with hydrogen sulfide, sulfur dioxide, hydrochloric acid, etc., enters above the center of the top of 6 1/2 impingement plates and contacts the upward flow of the rotating air current. "The combination of water curtain, spray, and impingement cone envelopes the particles or dust rising with the air and carries them down into the cone and out of the collector." Operating identically with Type HC, are the Type IC and Type JC collectors. The former is used for dust extraction in the submicron range, while the latter is utilized where high efficiency is not important or much of the dust is above the submicron range. All these collectors are safe when inflammable liquid or solid particulate matter are to be collected, and for inflammable carrier gas.

131

1955
COMMITTEE ON AIR POLLUTION REPORT. Arch. Indus. Health, v. 11, June 1955: 513-520.
DLC (RC963.A14, v. 11)

After extensive studies in England, Scotland, and Wales, the recommendations of the Committee on Air Pollution--to take the form of the "Clean Air Act"--have the objective of reducing by 80% the total smoke in all heavily populated areas, and the ultimate solution of the problem of gaseous pollution. The most serious pollution is that arising from combustion of fuels in urban areas subject to natural fog. Some of the sources of pollution are discussed, together with the findings and recommendations for their elimination or control.

132

1953
COMPACT AIR SAMPLER. Mech. Eng., v. 75, Sept. 1953: 731-732, illus.
DLC (TJ1.A72, v. 75)

A portable, compact instrument for accurate air sampling of gases, dusts, and vapors is pictured. The pump which draws air through the glass scrubbers operates on 110 volts ac. The scrubbers are of the usual small impinger type, capable of long periods of use. Space is provided for 3 small reagent bottles to carry sampling solutions into the field.

133

Compton, K. G., 1955
A. Mendizza, and W. W. Bradley.
ATMOSPHERIC GALVANIC COUPLE CORROSION. Corrosion, v. 11, Sept. 1955: 383t-392t.
DLC (TA462.C65, v. 11)

Measurements of weight losses of couples in a marine, an industrial, and a severe tropical atmosphere are reported. Tests involving thin sheet electrode material separated by filter paper saturated with electrolyte are reported. Potential measurements and weight loss data are given. Specimens exposed to the atmospheres show several apparent weight loss anomalies. Measurements of corrosion currents described provide a quick means for determining probable relative corrosion behavior of couples. Differences between couples "exposed" and "sheltered" are noted. Quantitative data provided are intended to be useful to the design engineer. (Authors' abstract)

134

Comstock, C. C., 1954
L. H. Lawson, E. A. Greene, and
F. W. Oberst.
INHALATION TOXICITY OF HYDRAZINE VAPOR Arch. Indus. Hyg. and Occupat. Med., v. 10, Med. 1954: 476-490, illus.
DLC (RC963.A14, v. 10)

Acute, subacute, and chronic exposure of various laboratory animals to inhaled hydrazine vapor indicated the substance to be toxic. Daily exposures to concentrations of 6 mg/cu m over a 6-month period produced little pathology while concentrations of 18 mg/cu m produced marked effects and sometimes death. The vapors were found to cause lung damage, inflammation of the liver, focal interstitial nephritis, anorexia, tremors, weakness, and sometimes convulsions resulting in death. Anorexia and weight loss may be the earliest symptoms to occur in man. On the basis of these experiments, it appears that the maximum allowable concentration (MAC) for hydrazine is below 6 mg/cu m (5 ppm).

135

1956
CONTINUOUS SMOKE SAMPLER AIDS AIR POLLUTION FIGHT. Eng. News-Rec., v. 157, Oct. 4, 1956: 80. DLC (TA1.E61, v. 157)

"As an aid to the battle against air pollution, Research Appliance Co. offers the AISI smoke sampler. It can be used to: (1) make records of smoke concentrations over a long period of time; and (2) trace sources of smoke and particles in the air. The sampler, according to the company, records smoke and other air pollutants by pumping air samples through a filter-paper tape reeling off at 1/2-hr, or 2-hr intervals. An electric light shines through the polluted tape, and the reduction of light transmission is measured by a light-sensitive cell and millivolt meter." (Quoted in full)

136

Cook, W. W. 1956
AIR POLLUTION (MANAGEMENT AND COMMUNITY OPINION). Air Conditioning, Heating, and Ventilating, v. 53, Feb. 1956: 107-108. DCU

An opinion survey regarding air pollution and public relations was made. Individuals queried were either top officials of 1 of 177 leading companies likely to have air pollution problems or 1 of 67 law enforcement officials responsible for air-pollution control in a major industrial city. The industry executives indicated the following: (1) The pace followed in elimination or control of air pollution is determined by public opinion. (2) The situation has improved in the last 5 years. (3) Federal tax benefits may enable more money to be spent on the problem. (4) Federal or state enforcement or control is not desirable. (5) Private dwellings and autos contribute greatly to the problem. (6) More research pertaining to causes and cures is needed. Law enforcement officials indicated that complaints are on the upgrade. They maintain that industries are the main offenders (paint, varnish, chemicals, etc.). The existing odor problem is difficult to solve. More research is needed, as well as objective standards of measurement. This should make law enforcement feasible. A statistical analysis of the survey is also presented.

137

Corbett, P. F. 1953
THE INFLUENCE OF CERTAIN SMOKES AND DUSTS ON THE SO_3 CONTENT OF THE FLUE GASES IN POWER-STATION BOILERS. Jour. Inst. Fuel, v. 25, May 1953: 410-417, 446, illus.
DLC (TP315.I6, v. 25)

The object of the tests described was to minimize fouling and corrosion of the external heat-exchange surfaces by sulfur trioxide in the flue gases. In the earlier tests the dew-point meter alone was used to assess potential trouble; later, both a chemical method of analysis and a corrosion probe were used. The preliminary tests with zinc oxide smoke confirmed that a sufficiency of fine particulate material could remove, or inhibit the formation of sulfur trioxide in the flue gases. On occasion, additions of as little as 0.25% zinc by weight of the fuel burned were sufficient to remove a sulfuric acid dew point of 310°F. In the next series of experiments, dust collected from the electrostatic precipitors of adjacent pulverized fuel-fired boilers was used; finally, tests were carried out on 2 boilers (one a chain-grate-fired boiler and the other retort-fired), both of which had been fitted with auxiliary pulverized-fuel burners. It was confirmed, by all 3 methods of assessment, that, quite apart from its other advantages, auxiliary pulverized-fuel firing had materially diminished the corrosive nature of the flue gases. Suggestions as to mechanism of the action of dusts on flue gases are also included. (Author's abstract)

138

[Corey, R. C., 1956
and others].
TENTATIVE INCINERATOR CODES, PARTS I AND II. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 44-47. DLC

Parts I and II of the Tentative Incinerator Codes of the Technical Coordinating Committee, Air Pollution Control Association, are given. Part I, Definitions and Classifications, covers incinerator terminology, classification of combustible wastes, and classification of incinerators. Part II, Tentative Code for Flue-fed Incinerators, covers permits, plans and specifications, name plate, location and mounting of incinerator, furnace construction and design, auxiliary burners, service openings, vestibule or compartment, stack height, spark arrester, and settling chambers.

139

Coulbert, D. C. 1952
MACH-ZEHNDER INTERFEROMETER APPLICATIONS. Mech. Eng., v. 74, Dec. 1952: 1005-1010, illus. DLC (TJ1.A72, v. 74)

The Mach-Zehnder interferometer is illustrated, and the optical system is diagrammed. The instrument produces light and dark areas on a screen indicating light interference in the optical path and a change of refractive index from different fluid densities. A photographic record, an interferogram, pictures the field around a 2-dimensional system. The instrument has a 9- by 5.5-in. elliptical field, and the optical housing can be rotated 90° for vertical or horizontal flow fields. Interferograms are given of various applications for the instrument.

140

1955
COURTS AS FIRST RESORT. Chem. Week, v. 77, Oct. 8, 1955: 38. DLC (TP1.C37, v. 77)

At Houston, Tex., hearings were scheduled during the week of Oct. 2-8, [1955] in civil court and the following week in criminal court against Consolidated Chemical Industries and Merichem Co., respectively. County Attorney Holman is asking that Consolidated be enjoined from making sulfuric acid until air-pollution-control devices are installed; the nature of the air-pollution case against Merichem is not reported. In Chattanooga, Tenn., 3 farmers have filed $25,000 suits against Tennessee Copper Co.; they assert that through "carelessness and negligence", the company allowed its plant to emit fumes that damaged crops, fruit, timber, fences, roofs, and soil on their nearby farms.

141

Coykendall, L. H. 1954
and P. R. Loughin.
BOILER AND FURNACE DESIGNED FOR SPREADER-STOKER FIRING. Trans. Amer. Soc. Mech. Engineers, v. 76, Aug. 1954: 873-881.
DLC (TJ1.A7, v. 76)

A history of spreader-stoker firing, and the design of a furnace and boiler are presented. The efficiency of the flue-dust collector tested determines the amount of flue dust which is returned to the furnace. The analysis and sizing of the coal and flue dust collected are plotted.

142

Crabaugh, H. R., 1954
A. H. Rose, Jr., and R. L. Chass.
DUST AND FUMES FROM GRAY IRON CUPOLAS. HOW THEY ARE CONTROLLED IN LOS ANGELES COUNTY. Air Repair, v. 4, Nov. 1954: 125-130. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The size, concentration, and analysis of dust and fumes from gray iron cupolas and stack gas data are presented for different operating conditions. The efficiencies of several scrubbers, a baghouse filter, and an electrostatic precipitator in reducing dust from cupolas are compared with results obtained with a gas-fired reverberatory-type melting furnace. Collection efficiencies of better than 95% are obtained with baghouse filtering and electrical precipitation. "The average discharge of dust and fumes from the cupolas is about 14.8

lb/ton of material charged, and consists mainly of silicon and iron compounds." Examples are given of installations in Los Angeles County employing various types of control equipment.

143

Crass, M. F., Jr. 1956
AIR POLLUTION CONTROL IN THE CHEMICAL INDUSTRY. Indus. Wastes, v. 1, Jan-Feb. 1956: 99-103. (Paper presented at 20th Annual Meeting of the Industrial Hygiene Foundation of America, Pittsburgh, Pa., Nov. 17, 1955) DLC

Outdoor air pollution is discussed as it relates to the chemical industry, and as it has been dealt with on an industry-wide basis within the Manufacturing Chemists' Association. Many chemical firms now consider the disposal of all waste products to be an integral part of a new plant or process; in general, authorization to build new chemical plants is not given by management until waste control is assured. The amounts of money paid by the industry to control or eliminate air pollution, and the cost to a municipality when this has not been done successfully are discussed. It is stated that there are a federal law, 3 state laws, and well over 100 municipal ordinances dealing with some form of air pollution or smoke control now in existence. During the last series of legislative sessions, 74 bills were considered in 15 states, and some 24 connected with pollution were before the US Congress. An enumeration of 7 basic principles suggested for the reduction and control of air pollution is given. It is concluded that although specific air pollution incidents are unique and should be handled at the local level, the over-all problem is a national one, transcending city and state lines.

144

Craxford, S. R., 1952
A. Poll, and W. J. S. Walker.
RECOVERY OF SULPHUR FROM FLUE GAS BY THE USE OF AMMONIA. Jour. Inst. Fuel, v. 25, Jan. 1952: 13-14, illus.
DLC (TP315.I6, v. 25)

Equipment was installed to treat 1,000 cu ft/hr of flue gas from a Lancashire boiler in order to study the recovery of sulfur from the flue gas by the use of ammonia, according to the Fulham Simon-Carves process. As a scrubber, this equipment was entirely satisfactory; when the composition of the liquor was right, the concentration of sulfur dioxide in the exit gas was found to be as low as 0.0005%, which corresponded to the removal of some 99% of the sulfur dioxide in the flue gas. The control of the composition of the liquor was at first difficult, owing to the building-up of too high concentrations of sulfites and bisulfites, but the addition of a little oxidation catalyst ($MnSO_4$) overcame this difficulty. Subsequently, when the metalwork in the equipment had become corroded, the resulting iron oxide was found to be a sufficiently good oxidation catalyst. (Authors' abstract in part)

145

1956
CRC GROUP ANALYZES EXHAUST OF CARS OPERATED ON L. A. FREEWAY. S. A. E. Jour., v. 64, Mar. 1956: 47-48. DLC (TL1.S5, v. 64)

A road test of over 50 cars was made by sampling exhaust gases from cars as they idled, accelerated, cruised, and decelerated on the Los Angeles, Calif., Freeway. Special equipment allowed continuous analysis of the exhaust gases from the moving test cars. In the laboratory, mass spectrometers and infrared spectrometers were used to measure organic constituents, nitrogen oxides, carbon monoxide, and carbon dioxide in exhaust gas samples.

146

Crossmon, G. 1952
COUNTING OF DUST PARTICLES BY PHASE MICROSCOPY. Arch. Indus. Hyg. and Occupat. Med., v. 6, Nov. 1952: 416-420.
DLC (RC963.A14, v. 6)

With a phase microscope, using a green filter, dust particles can be seen distinctly in shades of gray or white, depending on their optical path, against a green background. The particles can be accurately counted with less fatigue than with the usual light-field method; the usual counting chambers can be used.

147

Crumley, P. H., 1956
and A. W. Fletcher.
THE FORMATION OF SULFUR TRIOXIDE IN FLUE GASES. Jour. Inst. Fuel, v. 29, Aug. 1956: 322-327, illus. DLC (TP315.I6, v. 29)

Sulfur trioxide (SO_3) content in the flue gases was determined chemically both from an oil-fired experimental furnace, and from an oil-fired boiler at a power station. The results obtained indicate that operating conditions as well as sulfur content have an important effect on SO_3 formation during combustion. The concentration of SO_3 increased with the sulfur content of the fuel, but as the sulfur content increased the rate of increase of SO_3 concentration fell off. The percentage oxidation of sulfur dioxide (SO_2) to SO_3 fell in a corresponding way and, over the range of sulfur contents investigated (0.5 to 4.0%), decreased from 5.0 to 3.2%. The theory that above a certain sulfur content the amount of sulfur in the fuel would have little effect on the SO_3 in the flue gases, was not confirmed by the present results over the range of sulfur content found in commercial fuels. It seems likely that trouble caused by SO_3 will continue to increase with sulfur content up to the highest values found commercially. The similarity of results obtained with kerosene and distillate fuel oil suggests that the effect of flame temperature on SO_3 production may be general. The reason for SO_3 production with the 3%-sulfur distillate fuel being less than with kerosene (3% sulfur) has not yet been established, but it is likely that SO_3 production will always tend to be lower with heavy fuels than light fuels. Reduction of excess air to the point where incomplete combustion is obtained causes a large reduction in SO_3 production, but usually the production of smoke and loss of efficiency which result make this measure impractical. (Authors' abstract in part)

148

Cumming, A. P. C. 1954
APPLICATION OF INFRARED SPECTROMETRY TO THE ANALYSIS OF COMBUSTION PRODUCTS CONTAINING CARBON DIOXIDE, CARBON MONOXIDE, AND SMALL PROPORTIONS OF PROPANE. Jour. Appl. Chem., v. 4, Oct. 1954: 561-567. DLC (TP1.S612, v. 4)

A number of experimental variances in the analysis of carbon dioxide, carbon monoxide, and propane by a single-beam infrared spectrometer are considered. Curves of the optical density plotted against the concentrations of these gases are presented. Of the binary mixtures analyzed, propane-nitrogen showed closest agreement with Beer's law, while propane in the complete mixtures gave the least deviation. These results were obtained with accuracies of 0.1, 0.2, and 0.4% for propane, carbon dioxide, and carbon monoxide, respectively.

149

Cumming, A. P. C. 1955
NOMOGRAM FOR DETERMINATION OF EXCESS AIR IN COMBUSTION. Jour. Inst. Fuel, v. 28, July 1955: 342-344, illus.
DLC (TP315.I6, v. 28)

A new nomogram is presented from which the percentage of excess air can be read off as soon as the flue-gas analysis is known. The nomogram can be applied to the combustion of all fuels producing on combustion only CO_2, SO_2, H_2O, CO, and H_2, or any mixture of these. It is applicable alike to gaseous, liquid, and solid fuels, and covers the range up to 500% excess air with a readable accuracy of about 1%. The theoretical basis of the nomogram is discussed, and various equations are given. (Author's abstract in part)

150

Cumming, W. M., 1952
W. H. S. Massie, and P. D. Ritchie.
PHYSICOCHEMICAL STUDIES ON DUSTS. III. FACTORS AFFECTING THE WETTING OF AIRBORNE SILICA DUSTS BY AQUEOUS SPRAYS. Jour. Appl. Chem., v. 2, July 1952: 413-422, illus. DLC (TP1.S612, v. 2)

Apparatus is described for measuring the settling rate of a suspended dust cloud by a photocell device. An empirical "settling factor" is derived from the results which may be used to compare the settling characteristics of different dusts, and this is used to examine the effect of atmospheric humidity and of aqueous sprays on the sedimentation of 5 graded silica dusts (< 1 micron, about 1 micron, 1-3 microns, 3-5 microns, 5-10 microns). The following conclusions are drawn: (1) the settling factor of silica dusts is not significantly affected by changes in relative humidity; (2) silica-dust reduction by water sprays is less than 50%, whereas it is 60-70% for sprays of wetting-agent solutions; (3) silica-dust reduction by sprays shows a slight variation over the droplet-size range 30-110 microns, the smaller droplets being slightly more effective than the large; and (4) silica dusts with particle size about 1 micron undergo the greatest reduction. The mechanism of dust reduction by sprays is discussed. (Authors' abstract)

151

Cumming, W. M., 1952
P. B. Dempster, and P. D. Ritchie.
PHYSICOCHEMICAL STUDIES ON DUSTS. IV. ACCURACY OF CHEMICAL ESTIMATION OF FREE SILICA IN ROCKS AND MINERAL DUSTS. Jour. Appl. Chem., v. 2, Nov. 1952: 658-663, illus. DLC (TP1.S612, v. 2)

The investigation of problems associated with the dust diseases silicosis and pneumoconiosis requires an accurate method for the estimation of free silica in rocks and airborne dusts. The method of Trostel and Wynne (fusion of finely-ground rock sample with potassium pyrosulfate) for the estimation of free silica has been applied to the analysis of coal-measure rocks, and its suitability critically studied. If 2 fusions and alkali extractions are carried out, and if the corrections are applied, the analytical accuracy is ± 2% in the absence of chalcedonic silica. In the presence of chalcedonic silica the result is low, since the loss of chalcedonic silica during analysis is greater than that of quartz. The method cannot be used to estimate accurately the free-silica content of mixtures containing both quartz and cristobalite, since the loss from cristobalite during analysis is greater than that from quartz.

152

Daly, C. F. 1956
PLANT ENGINEERING MEMOS: WATER SPRAY METHOD SUPPRESSES SMOKE. Indus. and Eng. Chem., v. 48, Feb. 1956: 101A
DLC (TP1.I6, v. 48)

Smoke evolved from burning gas is suppressed by steam injected or water sprayed into the base of the flame. The Eastern States Petroleum Co. uses a water spray consisting of 4 small spray nozzles 90° apart, and 3 larger nozzles 120° apart located 3 in. above the smoke flare.

153

Damon, W. A. 1955
ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY. Chem. and Indus., no. 41, Oct. 8, 1955: 1266-1270
DLC (TP1.S6332, no. 41)

According to legislation in England, industrial processes considered to be potential contributors to atmospheric pollution are prohibited from operation until inspected for the presence of suitable control equipment. Methods to control emissions include: (1) production of a byproduct from the gases which might otherwise be emitted; (2) destruction of the pollutant by burning, scrubbing with alkali, or absorption; (3) complete burning of the constituents of the process by catalytic combustion; (4) construction of chimneys having suitable height, and effective draft fans. In the last method, it has been pointed out that the rate of emission rather than simply the concentration, the weather conditions, and the amount of turbulence downwind influence the dispersion of pollutants discharged into the atmosphere.

154

Davenport, O., 1955
and B. Woods.
PERFUMED WASTES. Sewage and Indus. Wastes, v. 27, Oct. 1955: 1211-1212. (Paper presented at 5th Joint Meeting, New York Sewage and Industrial Wastes Association and New England Sewage and Industrial Wastes Association, Albany, N. Y., June 13-14, 1955) DLC (TD511.S4, v. 27)

Complaints of perfumed odors were received at the primary sewage treatment plant at Suffern, N. Y. Odor tests located the source of odor as industrial wastes from a cosmetic products plant, Avon Products, Inc. Wash water from the manufacturing kettles and filling machines contained cosmetic creams, lotions, bath oils, toilet waters, and cosmetic ingredients, many of which formed stable emulsions even after considerable dilution. A satisfactory treatment procedure, based partially on changes of pH, use of activated charcoal, and filtration, was instituted. The daily chemical cost of treatment is said to be $11.32 and the labor cost $15.64; the cost of the equipment and building was approximately $45,000.

155

Davis, H. M. 1955
HAZARDS OF SMOG. Sci. News Letter, v. 67, May 7, 1955: 298-300. DBS

The history and known causes and effects of smog are summarized, and examples are given of smoke-abatement progress. The problem of preventing radioactive fallout is compared to the smoke control problem.

156

Davis, R. F., 1955
and J. C. Holtz.
EXHAUST GASES FROM DIESEL ENGINES. Chapter 9. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 74-94. DLC (TD883.I5, 1955)

Results are presented of tests conducted by the Bureau of Mines on 5 diesel engines to determine relationships between exhaust-gas composition and fuel/air ratio. Carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, oxides of nitrogen, aldehydes, and nitrogen (by difference) were determined. Diagrams are given showing the effect of aldehyde concentration on the odorous and irritating properties of diesel exhaust gas. Experiments on the removal of aldehydes by scrubbing with water and with aqueous sodium sulfite solution inhibited with hydroquinone are reported; the latter method is practical on mobile diesel equipment. About 50% of the oxides of nitrogen were removed, in small scale tests, by scrubbing with ferrous sulfate solutions. The effect of change in altitude on the exhaust-gas composition is noted.

157

Day, G. J. 1955
SOME AIRBORNE OBSERVATIONS OF CONDENSATION NUCLEUS CONCENTRATION. Geofis. pura e appl., v. 31, May-Aug. 1955: 169-181, illus. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) DGS

Studies of condensation nuclei concentrations were made from an airplane, using a photoelectric condensation nucleus counter. On the basis of these preliminary studies, it was concluded that clean maritime air contains about 2×10^2 cm^{-3} condensation nuclei at normal cloud-base levels. Concentrations of nuclei over disturbed sea surfaces are increased because of the effect of sea spray. The general concentration over land, of about 2×10^3 cm-3, may be increased to 15×10^3 cm^{-3} by specific industrial sources or to 5×10^3 cm^{-3} over a large industrial or domestic area. The concentration over land generally falls very sharply at a height of about 6000 ft. Large decreases of concentration vertically are usually associated with inversions.

158

1954
DEATH ON THE AIR. Indus. and Eng. Chem., v. 46, Nov. 1954: 13A. DLC (TP1.I6, v. 46)

It was suggested that the irritating materials in smog might be water-soluble metal ammonia sulfates with particle sizes about 5-10 microns. X-ray diffraction of smog samples in the Donora, Pa. area showed zinc and other metal ammonium sulfates, while samples of London smog contained ammonium chloride and calcium sulfate. One x-ray diffraction pattern of smog is shown.

159

1953
DEATHS DURING THE FOG. The Lancet, v. 264, Feb. 7, 1953: 288-289. DLC (R31.L3, v. 264)

In a report to the [London County] Council's Public Health Committee, Dr. J. A. Scott, gave data on the number of deaths registered in the county for the week ending Dec. 13, 1952. The mortality data, which cover the period of the fog of Dec. 5-

9, 1952, are compared with figures for other weeks during the cholera epidemic of 1866, the great fog of 1873, and the influenza epidemic of 1918. Daily atmospheric smoke and sulfur dioxide averages at County Hall, London, from Dec. 3-11, are also tabulated. An analysis of all the deaths in the County of London between Nov. 15 and Dec. 27 showed that the increase was more pronounced among babies and old people, and among circulatory and respiratory cases. Dr. E. H. R. Smithard, in a report to the Lewisham Borough's Public Health Committee, noted the abnormally large number of deaths in the Sydenham District, as compared to the other 2 districts of the borough. He suggests 3 possible explanations: (1) an older population in the Sydenham area; (2) a denser fog caused by the geographical configuration; and (3) a more poisonous fog caused by greater atmospheric pollution. Mention is made of a new and popular type of slow-burning fire as a likely source of increased atmospheric pollution.

160

Delman, A. D., 1954
B. B. Simms, and A. R. Allison.
EVALUATION OF CHEMICAL PROTECTANTS AS INHIBITORS OF OZONE-INDUCED DEGRADATION OF GR-S. Analyt. Chem., v. 26, Oct. 1954: 1589-1592. DLC (TP1.I615, v. 26)

This investigation was undertaken to devise a practical method for evaluating the protective ability of "anti-ozodant" chemicals for inhibiting the ozone deterioration of GR-S and other elastomeric materials. A method is presented which utilizes the rate of change in viscosity of polymeric solutions as a criterion for such evaluations. Representative curves, indicating in % of initial viscosity index with time of ozonization, are presented for several chemical additives for elastomer formulations which have been commercially advocated as retardants of ozone degradation. (Authors' abstract in part)

161

Dempster, P. B., 1952
and P. D. Ritchie.
SURFACE OF FINELY-GROUND SILICA. Nature, v. 169, Mar. 29, 1952: 538-539.
DLC (Q1.N2, v. 169)

The existence of a highly soluble surface layer on quartz particles has been demonstrated in the laboratory, and the properties of the layer studied in considerable detail. All siliceous dusts examined possessed initially a high-solubility layer which is apparently not discrete, but blends smoothly into the less soluble core. A modified layer of silica, not estimated by differential thermal analysis which is dependent on the specific $\alpha \rightleftharpoons \beta$ quartz transition at 575°C, has been demonstrated. A discussion of the factors and results of a rough approximation of the "thickness" of the high-solubility layer is given.

162

Dempster, P. B., 1953
and P. D. Ritchie.
PHYSICOCHEMICAL STUDIES ON DUSTS. V. EXAMINATION OF FINELY GROUND QUARTZ BY DIFFERENTIAL THERMAL ANALYSIS AND OTHER PHYSICAL METHODS. Jour. Appl. Chem., v. 3, Apr. 1953: 182-192, illus.
DLC (TP1.S612, v. 3)

The various disadvantages of orthodox chemical methods for estimating free silica in mineral dusts have been discussed previously. It was concluded that no method hitherto reported is applicable to finely-ground dusts without the use of various uncertain correction factors; therefore, attention has centered on physical methods of analysis. A summary is given of results obtained by the following methods: (1) differential thermal analysis, previously so successfully applied to the analysis of clays and refractory materials, and (2) densitometric x-ray diffraction.

163

Dennis, R., 1954
M. W. First, and L. Silverman.
DUST COLLECTORS TESTED IN FIELD. Chem. Eng., v. 61, May 1954: 187-189.
DLC (TN1.M45, v. 61)

In order to evaluate the performance characteristics of dust collection equipment, 10 tests were made on electrostatic collectors, and 16 tests on wet collectors. Several designs of each of these types of collectors were studied, and the data were analyzed and tabulated. The results indicated that electrostatic precipitators remove atmospheric dust less than 1 micron in diameter with 80-90% efficiency, while wet scrubbers collect coarse dusts in the size range of 20-140 microns in diameter.

164 1955

DENVER SUN RESEARCH AIDS L. A. SMOG STUDY. Sci. News Letter, v. 68, July 23, 1955: 53. DBS

Daily infrared spectrometer records of sunlight, taken at Denver and at Los Angeles, are compared to determine how much and what kind of chemicals are present in the Los Angeles atmosphere.

165

Dessens, H. 1955
[THE STUDY OF INDIVIDUAL CLOUD DROPLET RESIDUES] Étude individuelle des résidus de gouttlettes de nuages. (Summary). Geofis pura e appl., v. 31, May-Aug. 1955: 124-126. DGS

Previous work on condensation nuclei has been based on analysis of rainwater, snow, or hoar frost. The current studies were done on the residues left by the evaporation of actual cloud droplets (altitude 1450 m) to see if the residues were similar, and to study the relationships between cloud-droplet dimensions and their residues. The complicated procedure is outlined for capturing the droplets on a network of spider's threads; for continuously filming the droplet captured on 16-mm film; and for the immediate projection of the films (magnified 500 times) to sheets on which the thread-pattern is marked. This pattern of the size and position of the droplets is used in studying the microphotograph (also magnified 500 times) of the thread network showing the residues left by the droplets. A technique for use of the electron microscope in examining the very minute residues is outlined.

166

1955

DE-TEC-TRONIC SMOKE INDICATOR. Indus. Heating, v. 22, Mar. 1955: 631.
DLC (TH7201.I5, v. 22)

"The model 300-P90 Detectronic smoke indicator provides adjustable automatic control for secondary air injected via turbo-blower jets or venturi steam jets to supply oxygen deficiency and turbulence required to consume volatiles in the fire box and minimize discharge from the stack. The model has a large, continuously indicating smoke density meter calibrated in Ringelmann units, and a selector switch which provides for relay operation at any desired Ringelmann gauge smoke density." (Quoted in part)

167

1955

DEVELOPS NEW WET TYPE DUST COLLECTOR: Foundry, v. 83, Apr. 1955: 216.
DLC (TS200.F7, v. 83)

Dust laden air is drawn into the Hydro-Filter at normal duct velocity and directed against the surface of the water in the settling basin. Air rising from the basin is wetted by a rain of water, passes through a bed of glass spheres, emerges from the bed as bubbles which are again wetted, and finally passes through another bed of glass spheres. The cleaned, dried air is then discharged from the top of the unit, the entrained dirt and sludge being removed from the bottom of the unit.

168

1952

DEVICE FOR CHECKING AIR POLLUTION. Internat. Chem. Eng. and Process Indus., v. 33, Jan. 1952: 40
DLC (TP1.C355, v. 33)

A device for detecting numerous air pollutants in concentrations of less than 0.01 ppm is described. A motor-driven blower collects large volumes of air, and draws the air through powdered carbon-filled canisters at a rate of 40 cu ft/min. The collected pollutants can be removed from the absorber by blowing them with superheated steam, or by putting them in a vacuum and condensing the vapors.

169

1955

"DIAMOND-STUDDED" DEVICE MEASURES SMOG. Sci. News Letter, v. 68, Nov. 26, 1955: 351.
DBS

The meteorograph is a ft-long balloon-borne instrument to be used by the Los Angeles County Air Pollution Control District to probe the inversion layer. Temperature, pressure, and humidity data are etched on a smoked glass plate by recording arms with diamond points.

170

Dieringer, L. F., and W. T. Ingram.
1954

METHODS AND INSTRUMENTATION FOR AIR SAMPLING. Instruments and Automation, v. 27, July 1954: 1086-1089. DLC (TA165.A2, v. 27)

Atmospheric pollutants exist as particulate or gaseous matter, the sampling of which varies. Sampling particulate matter depends on the efficient separation and measurement of the volume of air sampled. The 5 methods for sampling particulate matter are sedimentation, filtration, impingement, electrostatic precipitation, and thermal precipitation. Instruments developed for each of these methods are discussed. Gas samples are obtained by absorption in a collecting medium, combustion in a heated tube, or adsorption on a solid material. Specific methods for collecting and determining organic compounds, hydrocarbons, and sulfur dioxide are described.

171

Diggle, W. M., and J. C. Gage.
1954

THE TOXICITY OF NITROGEN PENTOXIDE. Brit. Jour. Indus. Med., v. 11, Apr. 1954: 140-144, illus. DLC (RC963.A23, v. 11)

Methods are described for the preparation and analysis of test atmospheres of nitrogen dioxide and nitrogen pentoxide. Inhalation experiments on rats have shown that nitrogen pentoxide is a lung-irritant gas with a potency of the same order as phosgene. Acute pulmonary edema is produced by a 4-hr exposure to 9.7 milligrams/cu m (about 2 ppm), or by 12 daily 4-hr exposures to 4.25 milligrams/cu m (about 1 ppm). No edema, but symptoms of respiratory distress were obtained with 10 daily 4-hr exposures to 2.5 milligrams/cu m (about 0.5 ppm). Nitrogen dioxide has a much lower lung irritant action; 80 milligrams/cu m produces no edema, but a few rats show hemorrhage of the lung at this concentration. As nitric acid vapor is without obvious effect on rats at 63 milligrams/cu m, it is concluded that the toxicity of nitrogen pentoxide does not derive from the nitric acid formed therefrom, but that nitrogen pentoxide reacts directly with some constituent of pulmonary tissue. (Authors' abstract)

172

1956

THE DISPOSAL OF COAL REFUSE. TECHNICAL COORDINATING COMMITTEE T4 COAL REPORT. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 105-110, illus. DLC

Fires in coal refuse piles occur frequently, and atmospheric pollution from such sources (frequently intensified in valleys by atmospheric conditions) is often severe in mining communities. Various methods for compacting, sealing, and crushing piles of coal refuse are discussed in regard to new piles, and in the treatment of existing refuse piles. Some of the materials considered for sealing are: sludge; fine refuse or fly ash; compacted refuse; clay; and, possibly, after a period of weathering or the addition of a thin topsoil layer, a vegetative cover.

173

Dixon, B. E., 1954
and J. E. L. Swallow.
USE OF LIQUID FILMS IN THE STUDY OF THE ABSORPTION OF GASES BY DROPS. Jour. Appl. Chem., v. 4, Feb. 1954: 86-93, illus. DLC (TP1.S612, v. 4)

Three types of gas barriers have been examined in a study of the absorption of gases by liquid drops: (1) an inert gas stream moving across the base of a chamber; (2) a mass of foam in the barrier tube; and (3) a liquid film across the absorption chamber. Of the 3 types discussed and illustrated, the latter barrier (3) has proved to be the most successful. Quantitative determination of the carbon dioxide in the drops is made by titration with standard hydrochloric acid. High speed films showed no rupture of the barriers during the passage of the drops.

174

Douce, W. C. 1955
THE AMERICAN PETROLEUM INSTITUTE'S ACTIVITIES IN THE FIELD OF AIR AND WATER POLLUTION ABATEMENT. Oklahoma Agric. and Mech. College, Stillwater. Eng. Exper. Sta. Publ., v. 23, Dec. 1955: 55-61 (no. 97) (Paper presented Oct. 6, 1955 to the Industrial Wastes Conference of Oklahoma Water, Sewage and Industrial Wastes Conference, Stillwater, Oct. 5 and 6, 1955) DBS

The organization and achievements of the collective pollution control efforts of the petroleum refining industry are described. A 5 volume Manual on Disposal of Refinery Wastes (v. 2 - Waste gases and particulate matter; v. 5 - Sampling and analysis of waste gases and particulate matter), was initiated in 1951, and is continually being revised. New sections on micrometeorology, air-pollution surveys, and flare design are being issued as supplements. Research projects are sponsored at the Boyce-Thompson Institute, Yonkers, N. Y., to determine the effects of long exposure of vegetation to extremely low concentrations of fluorides in the atmosphere; and at Kaiser Engineers to organize available information on the use of cyclone dust collectors for the removal of particulate matter in gaseous wastes. The Smoke and Fumes Comm. of the Western Gas and Oil Assoc. is investigating the nature and origin of air pollution in Southern California. The results obtained to date by the research program of the Smoke and Fumes Comm. of the Div. of Refining of the American Petroleum Industry indicate that: (1) "the vapor-phase oxidation of sulfur dioxide to sulfur trioxide in the presence of nitrogen dioxide is too slow to account for the reduction of visibility which has been observed in urban areas...; (2) exhaust gas, when mixed with air which contains ozone, forms products which irritate the eyes, ... damage vegetation, ... and reduce visibility...."

175

Doyle, H. N. 1953
POLLUTED AIR, A GROWING COMMUNITY PROBLEM. Publ. Health Rep., v. 68, Sept. 1953: 858-867, illus. DLC (RA11.B17, v. 68)

The following aspects of air pollution are considered briefly: growth of the problem; possible health effects; incidents of serious pollution; effects on growth and development of animals and plants; economic aspects; loss of natural resources; major studies being undertaken; legal aspects; and some approaches to control of the problem.

176

1955

DOZENS OF DEFENDANTS. Chem. Week, v. 77, Nov. 12, 1955: 28. DLC (TP1.C37, v. 77)

In a civil suit at Houston, Harris County, Tex. vs. Consolidated Chemical Industries, the county is attempting to get an injunction against a violator of local air-pollution laws. Consolidated Chemical is accused of contaminating the air around its plant at Manchester. Attorney W. S. McGee is planning to include about 24 other firms "for protection of their own rights, or to make it possible to rectify any existing pollution". The hearing has centered on a broad study of how pollution is caused, and what methods of abatement are available.

177

Druckrey, H., 1954
and D. Schmahl.
[CARCINOGENIC EFFECTS OF INORGANIC AND ORGANIC POLYMERIZED SUBSTANCES IN RATS] Cancerogene Wirkung von anorganischen und organischen polymeren Substanzen bei Ratten. Unio internat. contra cancrum, acta, v. 10(2), 1954: 119-124. DNLM

Implantation, subcutaneously or in the peritoneal cavity of rats, of small plaques of cellulose "régénérée," polyethylene, polyamid or of polysterol, brought about the development of a sarcoma after a latent period of about 18 months.

The phenomenon was irreversible, and the development of the tumor was not caused by chronic irritation from the implant. This proved cancerigenicity of the various polymers, analogous to the mechanism of silicosis, seems to be based on their macromolecular state, and their quasicrystalline micellar state.

178

Druett, H. A., 1952
and K. R. May.
A WIND TUNNEL FOR THE STUDY OF AIRBORNE INFECTIONS. Jour. Hyg., v. 50, Mar. 1952: 69-81. DLC (RA421.J88, v. 50)

A vertical closed circuit wind tunnel is described in which a spinning top sprayer is used as a source of homogeneous particles of pathogenic organisms. The dry particle size may be set at any figure between 1 and 20 microns, and the cloud concentration can be varied over wide limits. Provision is made for humidity control. Animals may be exposed to the cloud, and samples taken. The apparatus can be sterilized with flowing steam and formalin. An appendix giving details of the operational techniques is available on request. (Authors' abstract)

179

Druett, H. A., 1954
and K. R. May.
PRODUCTION OF INDIVIDUAL, SIZED, DROPLETS BY HIGH-VOLTAGE "FIRING" FROM A MICROPIPETTE. Nature, v. 174, Sept. 4, 1954: 467-468. DLC (Q1.N2, v. 174)

Droplets of any desired size down to about 10 microns may be "fired" from the tip of a micropipette by applying a momentary high voltage to the liquid. Micropipettes, 1-2 microns in size, are easily made, though blockage from foreign substances in the liquid becomes a problem with such fine tubes. It should be possible to produce droplets continuously by means of a steady liquid flow and controlled frequency voltage pulse. Uses for such a system include fuel combustion studies where it may be desired to deposit minute quantities of substances to specific small areas, or in the calibration of droplet detectors. (Authors' abstract in part)

180

DuBridge, L. A. 1956
A SUMMARY OF PAPERS PRESENTED AT THE SOUTHERN CALIFORNIA CONFERENCE ON ELIMINATION OF AIR POLLUTION. Indus. Wastes, v. 1, July-Aug. 1956: 200-203. DLC

After discussion of some of the papers presented at the Southern California Conference on Elimination of Air Pollution, it is concluded that there are 3 distinct classes of air pollution in the Los Angeles area: (1) organic pollutants from all processes in which there is combustion of oil or gas or other organic materials, including wood and plastics; (2) sources of pollution which emit nitrogen oxides; and (3) sources of pollution which emit particulate matter, dust, and smoke. All 3 groups of contaminants must be brought under control since no 1 group can be considered to be solely at fault. The public must be kept informed, and be willing to support the actions of the Air Pollution Control District (Calif.) in order to achieve success in control since the problem is a community one.

181

Dubrow, B., 1955
and M. Nieradka.
DETERMINATION OF SPECIFIC SURFACE OF SIEVE-SIZE POWDERS. Analyt. Chem., v. 27, Feb. 1955: 302-305. DLC (TP1.I615, v. 27)

A procedure for measuring the particle size of materials having diameters in the range of 50-100 microns by the air permeability method is presented. A general photograph of the apparatus is given, and a diagram of its essential parts is explained. The method is simple, and requires less than 10 min for 1 determination.

182

Dudden, W. R. 1954
A NEW GAS SAMPLING APPARATUS. Gas World, v. 140, Sept. 11, 1954: 621, 624, illus. DLC (TP700.G2, v. 140)

A gas sampling bulb is shown, and the design and operation of the apparatus are explained. The apparatus offers the following advantages: (1) there are no gas flow restrictions caused by pressure change since the gas passes over mercury; (2) the stream and sample of gas are separated to prevent a change in the sample; (3) the sampling vessel can be of any shape; (4) the rate of sampling can be varied; and (5) the system is arranged to start or stop automatically if the gas changes. Electric circuits which control gas sampling can be operated by changes in specific gravity, by differences in burning conditions, by a timer, and by pressure control.

183

1955
DUST COLLECTOR. Elec. Light and Power, v. 33, Feb. 1955: 25. DLC (TK1.E213, v. 33)

This dust collector unit sends the dust particles entering the conical inlet into a swirling motion, while permitting the clean air to pass through without a change of direction. The standard unit consists of a cell of 9 tubes, each with an approach velocity of 1,000 ft/min and a cleaning capacity of 333 cu ft/min. Any number of these cells can be combined to fill the available cleaning area.

184

1956

DUST COLLECTOR RATING INCREASED. Air Conditioning, Heating, and Ventilating, v. 53, Mar. 1956: 144. DLC (TH7201.H4, v. 53)

The hp rating of the Model 64 dust collector has been increased from 1/2 to 3/4 by Torit Mfg. Co.... Twenty-four cloth filters in the cabinet-type unit provide 60 sq ft of filtering area. When used with one 4-in. inlet, the unit moves 500 cu ft/min of air at 5700 ft/min airspeed, and a static pressure of 4 in. of water. The unit may also be ordered with either one or two 3-in. inlets. (Quoted in part)

185

1955

DUST CONTROL: DUST-SETTLING CHAMBERS KEEP CANTON'S AIR CLEAN. Iron Age, v. 175, June 23, 1955: 119-120. DLC (T1.I7, v. 175)

A large dust-settling chamber on the roof of a Canton, Ohio steel mill settles 7000-9500 lb of iron oxide and other dust particles each week. The exhaust gases are blown into a large air duct in which the velocity of the gases is decreased and the larger particles settle out. From the duct, the gases pass to a baffled settling chamber where airborne particles are trapped permitting the cleaned gases to be discharged to the atmosphere.

186

1954

DUST MEASUREMENT IN BLAST-FURNACE GAS. Iron and Coal Trades Rev., v. 168, Jan. 22, 1954: 220. DLC (TN1.I7, v. 168)

A continuously recording photoelectric dust meter provides a continuous record of dust concentrations, and an alarm sounds when the dust exceeds a predetermined level. The instrument has 4 parts: (1) a sampling chamber; (2) amplifier and power supplies; (3) an indicator-relay meter; and (4) a continuous strip recorder. Provision is made for the return of excess dust to the furnace, or when within allowed concentrations, its discharge to the atmosphere.

187

1954

DUST PROBLEM SOLVED AT B&O COAL PIER. Utilization, v. 8, Aug. 1954: 41-42, illus. DLC (TP315.U85, v. 8)

The unloading of car-lots of coal into barges and ships at the B&O Railroad Company's Curtis Bay Coal Pier in Baltimore, Md., resulted in clouds of coal dust which were a hazard to workmen and a serious nuisance to the adjacent community. Therefore, a dust control system, actuated by the car-dumper operator by means of a foot switch, was installed. A water solution containing a nontoxic, noncorrosive chemical, Johnson-March Corporation's Compound MR, is applied to the coal. As a result, the treated coal arrives at the consumer's facilities virtually dust free. Usually less than 1% moisture/ton is added in treatment, considerably less than the amount applied when treated with plain water.

188

1955

DUST SCRUBBER. Chem. Week, v. 77, Oct. 29, 1955: 54. DLC (TP1.C37, v. 77)

"The Johnson-March Corp. (Philadelphia, Pa.) is out with a new dust control unit that is said to remove microscopic solids, fumes, and odors from exhaust gases -- at 99% efficiency. Known as the Type A hydroprecipitator scrubber, it collects dust by hydrocompressing gases through a system of multiple tubes into a water chamber. The scrubber comes in 15 sizes for capacities of 500 to 40,000 cu ft/min, and provides for continuous or intermittent sludge removal by manual, hydraulic, or mechanical means." (Quoted in full)

189

1955

THE DUSTPROOFING OF CONCRETE WITH SODIUM SILICATE. Chem. Age, v. 73, July 2, 1955: 25-26. DBS

This article briefly describes the treatment of concrete to produce a dustproof surface for floors, roadways, or factory yards which are subject to abrasive action. Advantages of silicates over other dustproofing agents, e.g., magnesium silicofluoride and linseed oil-white spirit mixtures, are summarized, and graphs are given showing the effects of abrasion on concrete treated in different ways.

190

Eichfelder, K. 1955

[PURIFICATION OF GASES, PARTICULARLY WITH THE VENTURI-SCRUBBER] Nassreinigung von Abgasen, inbesondere mit Venturi-Scrubber. Zeitschr. Erzbergbau und Metallhüttenwesen, v. 8, Mar. 1955: 111-117. DBS

The operation of the Pease-Anthony Cyclonic Scrubber is described, and typical installations are pictured. The performance of the scrubbers in removing dusts and mists from various industrial processes is summarized in tables and discussed.

191

Eisenbud, M. 1956

MONITORING NETWORK FOR MEASURING RADIOACTIVE FALLOUT. Jour. Amer. Water Works Assoc., v. 48, June 1956: 659-664, illus. (Paper presented at the Nuclear Engineering and Science Congress sponsored by Engineers Joint Council, Cleveland, Ohio, Dec. 12-16, 1955) DLC (TD201.A512, v. 48)

In a short introductory section on the basic mechanics of fallout, it is mentioned that inert dust particles which are sucked into the fireball following the detonation of a nuclear device, may serve as nuclei on which the fireball vapors condense as a radioactive coating. Some vapors will condense around ionic nuclei to form particles which may or may not aggregate with the larger dust particles. Radioactive particles initially cover a wide range of particle sizes, with those in the range of less than 1 micron to about 10 microns in diameter likely to be discrete spheres. The dust particle aggregates are more apt to be larger, often being greater than 100 microns. The radio-active particles form at great heights from the ground, and their dispersion depends upon many variables. Assuming a density of 3, one of these larger particles settles by gravity at a terminal velocity of 180 ft/min, making it possible for sedimentation to play a dominant role. (Quoted in part)

192

Eiserman, G. V., 1954
and W. L. Prout.
FACTORS AFFECTING DUST COLLECTOR EFFICIENCY. Air Repair, v. 4, May 1954: 35-39. (Paper presented at the 47th Annual Meeting of the Air Pollut. Control Assoc., Chattanooga, Tennessee, May 3-6, 1954) DLC

A method is presented whereby the performance of a mechanical dust collecting system operating under specified conditions can be predicted. The variables which affect dust collector performance are coordinated through the terminal velocity theory which is based on the velocity of a particle, falling in still air or other fluid, after a condition of uniform motion is obtained. Tables and diagrams are given which illustrate the application of the method in determining the efficiency of the Aerodyne Collector. This method can be applied to any mechanical collector which subjects the dust particles to centrifugal and aerodynamic forces.

193

1954
ELECTROSTATIC AIR CLEANER. Jour. Franklin Inst., v. 257, Mar. 1954: 262.
DLC (T1. F8, v. 257)

The Precipitron, developed by the Westinghouse Electric Corp., removes 90% of all airborne dust and pollen including particles as small as 1/250,000 in. in diameter. Of the 2 models described, one handles 1000-1200 cu ft/min, the other 2000-2400 cu ft/min.

194

1954
ELIMINATION OF DUST DURING DRILLING. Iron and Coal Trades Rev., v. 169, July 2, 1954: 27-28, illus. DLC (TN1. I7, v. 169)

Dust created during drilling operations is removed by the "Hemborn" dust extractor, a cross-section of which is illustrated. Dust is removed from the drilled hole by suction and enters the filter unit where, after passing through 3 cloth filter bags, even the finest particles are removed, and the cleaned air is exhausted to the atmosphere.

195

Ellis, O. B. 1955
HOW ZINC COATINGS SLOW ATMOSPHERIC CORROSION. Iron Age, v. 176, Aug. 18, 1955: 79-81. DLC (T1. I7, v. 176)

The value of metallic coatings in preventing corrosion depends considerably on the uniformity of the coating; this can be checked by a beta-ray gauge. Alloy coatings protect the base metal longer because the product of the corrosion of the alloy provides additional protection. Since corrosion products form characteristic colors, it is possible to determine visually when the coating has lost its effectiveness.

196

Emanuelsson, A., 1954
E. Eriksson, and H. Egnér.
COMPOSITION OF ATMOSPHERIC PRECIPITATION IN SWEDEN. Tellus, v. 6, Aug. 1954: 261-267, illus. DLC (QC801. T4, v. 6)

Data for a 2-yr period are presented in graphs to show the geographic distribution over Sweden of the annual amounts of Na, Cl, K, Ca, NH_3-N and NO_3-N brought to earth by precipitation. The work is to be continued on a greater scale in order to obtain data on the distribution patterns for various elements over a much larger area; thus, it may be possible to gain more definite information on the origin of atmospheric compounds.

197

1955
ENLARGED FACILITIES FOR SMOG STUDIES. Res. for Ind. News Bull. (Stanford Res. Inst.), v. 2, May 1955: 1-4. TID

A description is given of the investigations of Los Angeles smog at the air research laboratories: Pasadena and Menlo Park, Calif., and Provo, Utah. Using such devices as continuous aerosol collectors, oxidant analyzers, soluble gas collectors, sulfur dioxide analyzers, and freeze-out traps, many components of smog were isolated and analyzed, including oil, sodium chloride, sulfur dioxide, sulfuric dioxide, sulfuric acid, ozone, formaldehyde, formic acid, acrolein, soot, and nitric acid. Air with smog properties was produced by artificially irradiating smog-free night air. These smog properties were tested by fumigating vegetation samples in special greenhouses. Using 10 common weeds, a plant index has been set up which allows a trained technician to tell what airborne gas caused a particular plant damage.

198

1955
THE EPIKOTE RESIN PLANT AT STANLOW. Chem. Age, v. 73, Sept. 24, 1955: 635-638. DBS

The results obtained when several Epikote resin-based coatings were tested, for periods up to 15 months, for corrosion by the atmosphere, sulfur dioxide, caustic soda spillage, etc., are summarized in a table.

199

Epstein, E. S., 1956
C. Osterberg, and A. Adel.
A NEW METHOD FOR THE DETERMINATION OF THE VERTICAL DISTRIBUTION OF OZONE FROM A GROUND STATION. Jour. Meteorol., v. 13, Aug. 1956: 319-324, illus.
DLC (QC851.A283, v. 13)

A new method for determining the vertical distribution of ozone, utilizing only surface observations, has been developed. Infrared and ultraviolet observations are used to complement one another. The theoretical background of the method is discussed in detail, and the techniques of its application are described. Also presented are the results of applying the method to data collected in the 7 months beginning Feb. 1955 (124 days' observations). There are definite seasonal trends in the distributions, which are not related in any simple way to the total amount of ozone. The ozone is lowest at times of passages of troughs aloft. Ozone densities at low levels are greatest when surface pressure is lowest. (Authors' abstract)

200

Erickson, L. C., 1956
and R. T. Wedding.
EFFECTS OF OZONATED HEXENE ON PHOTOSYNTHESIS AND RESPIRATION OF LEMNA MINOR. Amer. Jour. Botany, v. 43, Jan. 1956: 32-36. (Paper no. 870, University of California Citrus Experiment Station, Riverside, Calif.)
DLC (QK1.B345, v. 43)

Lemna minor L. was used as a test plant in determining the effects of ozonated hexene and its source materials hexene and ozone on photosynthesis, respiration, chlorophyll content, and retention of semipermeability. Plants exposed to ozonated hexene for 24 hr had a photosynthetic rate which was about 30% of that of the control plants, while plants exposed to a comparable amount of ozone had a rate of about 60% of the controls. Respiration was stimulated by the ozonated hexene, but not significantly so by the ozone. Chlorophyll content in plants exposed to ozonated hexene for 24 hr was about 50% of that of controls, as compared with 60% in plants exposed to ozone. The reduced chlorophyll content in plants treated with ozone for 24 hr could account for the reduced rate of photosynthesis in these plants, but in those exposed to ozonated hexene for 24 hr the rate of photosynthesis was much less than could be accounted for by the reduced chlorophyll content. Increased conductivity of water in which the plants were floating during exposure to ozonated hexene or ozone indicated that an exposure of 24 hr destroyed semipermeability in 30% and 25% of the cells, respectively. Hexene did not have a significant effect on photosynthesis, respiration, or conductivity. The absorbance of the chlorophyll extracted from plants treated with hexene tended to increase with increased length of exposure, indicating an increased chlorophyll content. (Author's abstract)

201

Eriksson, E. 1952
COMPOSITION OF ATMOSPHERIC PRECIPITATION. II. SULFUR, CHLORIDE, IODINE COMPOUNDS. Tellus, v. 4, Nov. 1952: 280-303, illus.
DLC (QC801.T4, v. 4)

In this discussion of the composition of atmospheric precipitation, it is mentioned that in industrial areas it has been noted that the yearly amounts of sulfur brought down by precipitation are very high. Coal on combustion releases considerable amounts of sulfur into the atmosphere; sulfide ores used in industry certainly contribute to the sulfur content of air. Instances of "colored rain" have occurred when heavy concentrations of dusts from arid regions or of volcanic ash are washed out of the atmosphere. A bibliography of 317 references is included.

202

Faith, W. L. 1955
AIR POLLUTION FOUNDATION - WHAT IT IS AND WHAT IT DOES. S.A.E. Trans., v. 63, 1955: 586-590. (Paper presented at the S.A.E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955) DBS

The Air Pollution Foundation, formerly called the Southern California Air Pollution Foundation, is "an independent scientific organization supported by public-spirited citizens to help determine the causes of smog and implement its elimination." Foundation-sponsored research projects include: (1) an air tracer survey to determine the reliability of wind-trajectory techniques in calculating the movement of smog clouds; (2) a study of vertical components of air movement; (3) a chemical investigation to ascertain the precursors of smog using smog-sensitive plants as indicators; (4) a study of the photochemical reaction between hydrocarbons and nitrogen dioxide; (5) an aerometric survey of the Los Angeles Basin, consisting of correlation of air composition with eye irritation, plant damage, and reduced visibility; and (6) a study of physical measurement methods, e.g., microwave techniques in contaminant analysis, and carbon isotope labeling for determination of pollution sources.

203

Falk, H. L., 1956
I. Markul, and P. Kotin.
AROMATIC HYDROCARBONS. IV. THEIR FATE FOLLOWING EMISSION INTO THE ATMOSPHERE AND EXPERIMENTAL EXPOSURE TO WASHED AIR AND SYNTHETIC SMOG. Arch. Indus. Health, v. 13, Jan. 1956: 13-17, illus.
DLC (RC963.A14, v. 13)

Samples of various commercial aromatic polycyclic hydrocarbons, and samples of gasoline- and diesel-engine exhausts, were applied to or collected on filter discs. The discs were exposed to pure air or synthetic smog for varying lengths of time. Various qualitative and quantitative studies were made of the material on the discs following exposure. Some of the hydrocarbons studied were: chrysene; coronene; 1,12-benz perylene; 3,4-benzopyrene; fluoranthene; and pyrene. The survival time of the various hydrocarbons varied greatly; 3,4-benzopyrene belonged to the group with maximum relative stability, being fairly stable even in the presence of a strong oxidizing atmosphere such as characterizes Los Angeles smog. In certain of the compounds, there were also significant differences in stability in the light or the dark. Some modifying effect on the hydrocarbons of the soot particles acting as carriers, may explain the differences in the destruction rate of the aromatic polycyclic hydrocarbons in a pure unadsorbed state from that while adsorbed on soot.

204

Fannon, W. P. 1953
A NEW IDEA IN INCINERATOR STOKING.
Amer. City, v. 68, May 1953: 114-115.
DLC (HT101.A5, v. 68)

The history of refuse incineration in Baltimore leading to the incorporation of a mechanical stoking device is discussed. The sectioned grates are angled with a slope downward from the back to the front of the furnace. The alternately moving sections provide continual agitation, rapid burning, and constant exposure of new surface. Benefits gained by the stoker are: (1) increased furnace capacity; (2) elimination of visible stack discharge; and (3) reduction in labor, operation, and maintenance costs.

205

1955
FEDERAL POLICING: "PREMATURE". Chem. Week, v. 76, May 7, 1955: 15.
DLC (TP1.C37, v. 76)

Principal topics at the hearing of a Senate public works subcommittee were 2 bills concerning air and water pollution. One of these bills (S. 928, sponsored by Sen. Kuchel, Calif.) aims to amend the Water Pollution Control Act of 1948 to provide for federal government action on air-pollution control; the Kuchel bill would make it federal policy to encourage uniform air-pollution laws through a system of grants-in-aid. Three witnesses from the Manufacturing Chemists' Assoc. declared that both air and water pollution are best handled on the local level. Walker Penfield (Pennsalt International Corp.) stated that a national law on air pollution would be "somewhat premature" because each community has different conditions of climate and topography, and because air pollution is still not completely understood. The opinion of the witnesses was that the "place of the federal government is in the field of research and not in the field of control."

206

1955
FIGHTS OVER FUMES. Chem. Week, v. 77, Dec. 3, 1955: 36.
DLC (TP1.C37, v. 77)

The following is a list of civil suits based on claims for injury or property damage from chemical process plant fumes: "(1) Galveston, Tex. -- Leader vs. American Oil Co. -- asking $16,500 for alleged injuries to parents and daughter from 'noxious and caustic gas, oil, and vapor'; (2) Columbia, Tenn. -- Hanson vs. National Carbon Co. -- asking $50,000 for asserted damage to 560-acre farm from 'smoke, dust, fumes, gases, and other noxious substances'; (3) Beaumont, Tex. -- Killough Boiler & Welding Works vs. Magnolia Petroleum Co., Olin Mathieson Chemical Corp., and Texas Gulf Sulfur Corp. -- asking $151,084 plus interest for purported damages from 'various vapors, gases, and particles of solid matter', also asking injunction against continued contamination." (Quoted in part)

207

1955
FILTER PROCESS. Iron and Steel Engineer, v. 32, Nov. 1955: 263-264.
DLC (TS300.I63, v. 32)

A process developed by Wheelabrator Corp. for supercleaning atmospheric air with industrial-type air filtration equipment involves the charging of the filter bags with a filter aid which precoats the filtering surfaces and provides a highly efficient matrix upon which the fine particles of atmospheric dust and tarry matter are collected. In one operating installation employing Wheelabrator ultrafiltration, having a design volume of 720,000 cu ft/min of city air, the process reduces the dust content of the air from 5.21 to 0.04 mg/1000 cu ft. These figures are average values over a period of 1 year, and indicate a collection efficiency of fine atmospheric dust of 99.23%. (Quoted in part)

208

1955
FIND SMOG "FINGERPRINT" IN CITY ATMOSPHERES. Sci. News Letter, v. 67, June 4, 1955: 360.
DBS

At a meeting of the Air Pollution Control Association in Detroit, US Public Health Service scientists said that: (1) the absorption patterns obtained from spectrographs of particles in the air may help locate particular sources of smog; and (2) the infrared "fingerprints" noted in a study of smogs from 31 metropolitan areas in the United States, Alaska, and England probably reflect differences in industrial activity, waste incineration practices, or products of other human effort. High-volume samplers, operated by voluntary personnel of local and state agencies, were used to separate the particulate matter from each 2,000 cu m sample of air in a 24-hr period. Organic substances soluble in acetone; radioactivity; and a number of inorganic ions were estimated for about 2,000 such samples.

209

1955
FINES AND DAMAGES. Chem. Week, v. 77, Oct.
15, 1955: 39. DLC (TP1.C37, v. 77)

"In Oregon, 3 chemical process plants are involved in air pollution lawsuits: Reynolds Metals has been ordered to pay $38,293 for alleged injury to nearby residents from fluorine fumes from an aluminum smelter mill; Pacific Adhesives has been fined $100 for permitting allegedly offensive smells to escape from its plywood glue plant; and Weyerhaeuser Timber Co.'s kraft-board process plant at Springfield is the target of 2 suits. Pacific Adhesives has decided to appeal, and Reynolds is considering an appeal 'in view of the importance of this case to American industry.' The 'nuisance' petition against Weyerhaeuser was filed by 11 Springfield residents under a state law being used for the first time against a large concern; company officials have not, as yet, made a countermove." (Quoted in full)

210

First, M. W., 1952
and P. Drinker.
CONCENTRATIONS OF PARTICULATES FOUND IN AIR. Arch. Indus. Hyg. and Occupat. Med., v. 5, Apr. 1952: 387-388.
DLC (RC963.A14, v. 5)

A chart, plotted on logarithmic scale in the range of 10^3 to 10^{-13}, has been devised showing atmospheric conditions of pollution, with concentrations in g/cu m, according to meteorological conditions, and to human activity. A possible conversion error may apply in the small range from 10^{-3} to 10^{-4}, which covers contaminants like silica and lead, because some of the values have been reached by converting particle counts to weight assuming that 0.1 mg contains 5 million particles.

211

First, M. W., 1953
and L. Silverman.
AIR SAMPLING WITH MEMBRANE FILTERS. Arch. Indus. Hyg. and Occupat. Med., v. 7, Jan. 1953: 1-11, illus. DLC (RC963.A14, v. 7)

Laboratory and field studies have indicated a number of applications for molecular filters that offer advantages to the industrial hygienist in convenience, accuracy, and simplification in air-sampling. Dust counts may be obtained with molecular filters comparable to those using the midget impinger, but with an appreciable saving in time, labor, and equipment. Efficiencies of 100% have been obtained in the collecting of acid mists and metal fumes. (Authors' abstract in part)

212

First, M. W. 1953
NOTES ON PREPARATION OF DUST SAMPLES FOR MICROSCOPIC SIZING. Arch. Indus. Hyg. and Occupat. Med., v. 7, Jan. 1953: 58-60.
DLC (RC963.A14, v. 7)

The particle-size analysis of a dust sample depends on the preparation of a well-dispersed, representative sample suitable for microscopic examination. Some of the difficulties of preparing such a microscopic specimen, e.g., the "rubbing-out" process to achieve an even dust dispersion free of agglomerates, and the selection of satisfactory and clean mounting media, are discussed. A tabulation of the refractive index of several mounting media suitable for dust examination is given since it is necessary to select a mounting media with a refractive index different from that of the crystalline particles to be identified.

213

First, M. W., 1956
and others.
HIGH TEMPERATURE DUST FILTRATION. Indus. and Eng. Chem., v. 48, Apr. 1956: 696-702, illus. DLC (TP1.I6, v. 48)

A ceramic fiber was developed for the filtration of small particles from gases at temperatures above 1400°F. Diagrams of the filter testing apparatus and the sampling equipment are illustrated. The dust selected to test the 3 sizes of filter fibers was a technical grade black copper oxide. Data for the effect of filter depth, packing density, temperature, filtration velocity, and fiber size on the efficiency of removing various size particles are tabulated. The fiber appeared to be stable for a long service life.

214

First, M. W., 1956
and R. P. Warren.
FIELD EVALUATION OF WET FIBER FILTERS FOR TREATMENT OF AIR CONTAMINANTS. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 32-34, illus. DLC

Laboratory studies of the absorption efficiency of wet fiber cells and fiber droplet eliminators showed recoveries of approximately 99.9% for hydrogen fluoride, and greater than 90% recovery of sub-micron-sized chemical fumes and mists. Fibers (plastic or porcelain), scrubbing liquid (water or chemical absorbents), insoluble particulates in the gas stream (silica or talc dusts), construction of absorption equipment, and field installations are discussed. Tabular results are given for efficiencies of the following 3 installations: (1) The concentration of hydrogen fluoride in untreated exhaust air was sufficient to etch windows and react with the paint on automobiles. Use of a gas absorption scrubber, containing 3 wet-gas absorption stages and a dry filter, caused removal of 99.4% of the hydrogen fluoride. (2) A gas absorber was installed in a plant using hot glacial acetic acid and acetic anhydride. The absorber contained 2 stages of wetted-glass cells, a bent plate eliminator, and a final dry stage of fine glass fibers; collection efficiency was 99.2 to 99.4%. (3) A scrubber, made up of 2 wet stages and 1 dry stage, removed 99.8 to 99.9% of the contaminants produced by the combustion of silicon tetrachloride. Experience with wetted-fiber gas absorbers has demonstrated the practicality of this type of apparatus for air-pollution control of industrial effluents; tests have shown that the high efficiencies obtained in the laboratory can be duplicated in industrial practice.

215

First, M. W., 1956
and others.
TEST OF "FIBERFRAX" CERAMIC FIBERS FOR HIGH TEMPERATURE GAS FILTRATION. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 61-69. DLC

The collection of particulate matter is accomplished by impaction when the particles are larger than 1 micron, and by diffusional and electrostatic forces when the particles are smaller than 0.5 micron in size. Experimental equipment for tests up to 1500° F was designed for dust loadings of about 1 gr./1000 cu ft. The collection filter consisted of a number of layers of Fiberfrax, a new fibrous paper 0.040 in. thick and composed of fibers less than 1 micron in diameter. The test dust was technical grade black copper oxide with a sp gr of 6.4. The general test data are tabulated, as well as the various factors which affect the filtration efficiency. A number of difficulties arising in filtration at high temperatures were indicated.

216

Fisher, M. A., 1955
S. Katz, A. Lieberman, and N. E. Alexander.
AUTOMATIC COUNTING AND SIZING OF AEROSOL PARTICLES. (Abstract). Analyt. Chem., v. 27, June 1955: 1035. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955) DLC (TP1.I615, v. 27)

Problems of aerosol sampling, particle counting, and size measurement were discussed in connection with the development of an instrument for the rapid determination of aerosol systems. This device, which has been called an "aerosoloscope", achieves rapid measurement of solid or liquid aerosol particles in the size range of approximately 1 to 64 microns by a system in which the aerosol is measured automatically without collection, and the measurements are recorded on a system of electromechanical counting and scaling elements. The aerosoloscope consists of 3 major components: an aerosol flow system, an optical detection system, and an electronic measuring and recording system. The aerosol flow system draws a sample from the aerosol system into ducts where dilution down to 1% of the initial concentration can be made without appreciable particle losses. The aerosol then passes in a cylindrical stream through a well defined illuminated zone. Light scattered at 90° to the incident beam is collected on a photomultiplier and the signal is transferred to a series of 12 amplifiers and level detectors in cascade. These analyze each pulse and transfer it to its appropriate channel. The pulse is finally recorded in one of 12 counters, each corresponding to a predetermined particle size interval in the range of 1 to 64 microns. Internal calibrating and standardizing means are provided. (Authors' abstract)

217

Fitton, A. 1952
ASH AND ATMOSPHERIC POLLUTION. Jour. Inst. Fuel, v. 25, July 1952: 178-181, illus. (Paper no. 9 presented before the Fuel Institute, London, Oct. 29, 1952)

The source and magnitude of the pollution of the atmosphere by ash and its associated grits are considered. Methods of measuring the concentration of fly ash in flue gas, and of determining the size of the particles are briefly outlined; methods of reducing atmospheric pollution by means of plant design and control, and by the use of dust-extraction equipment are surveyed. The size, nature, and amount of ash which is emitted into the atmosphere can vary enormously, according to the type of coal, the type of combustion unit, and whether or not a dust-extractor plant is used. (Author's abstract in part)

218

1956
FIXED FLOW AIR SAMPLER. Chem. and Eng. News, v. 34, June 25, 1956: 3200. DLC (TP1.C35, v. 34)

"A new sampling device [Fixt-Flo Air Sampler] for air contaminants, made by Mine Safety Appliances, has an automatic flow control which compensates for changes in filter resistance caused by material collected on the filter.... The air to be tested is pulled into the instrument with a blower. Automatic control of airflow rate is provided by a compensating damper in a bypass duct for unfiltered air. Filtered air enters a plenum chamber, and passes through a fixed orifice in a spring-loaded diaphragm plate. As filter resistance increases, pressure in the plenum chamber decreases, thus releasing the diaphragm plate to close a switch that starts the bypass damper motor. The damper reduces the flow of bypass air, thereby increasing suction through the filter...." (Quoted in part)

219

Fletcher, A. W. 1956
AN IMPROVED APPARATUS FOR THE DETERMINATION OF SULPHUR TRIOXIDE IN GASES. Chem. and Indus., no. 16, Apr. 28, 1956: 303-304. DLC (TP1.S8332, no. 16)

An improved apparatus for the determination of sulfur trioxide in gases is illustrated. Flue gases from an oil-fired combustion chamber were sampled into the apparatus at the rate of 2-3 cu ft/hr, and wetted by an 80% alcohol solution flowing at about 300 ml/hr. A comparison of the results by this method and by the Corbett method are tabulated. The new apparatus is simple, and the analysis is easy and swift.

220

Flint, D., 1953
A. W. Lindsay, and R. F. Littlejohn.
THE EFFECT OF METAL OXIDE SMOKES ON THE SO_3 CONTENT OF COMBUSTION GASES FROM FUEL OILS. Jour. Inst. Fuel, v. 26, Sept. 1953: 122-127, illus. DLC (TP315.I6, v. 26)

This is a continuation of the research reported earlier by P. F. Corbett (Jour. Inst. Fuel, v. 26, Aug. 1953: 92-106). The present work was undertaken to provide quantitative data on the influence of various additives to the fuel burned, as a method of decreasing the quantity of sulfur trioxide (SO_3). Measurements were made with a dew-point meter on 3 relatively small oil-fired appliances, 2 being sectional boilers, and the third, on which most of the work was done, was a refractory furnace. Five oils, varying from a heavy fuel oil (3.5% sulfur) to a gas oil (0.75% sulfur), were burned in the refractory furnace, the dew-point of the combustion products being in the range 250° to 300°F. Measurements on the gases from the heavy fuel oil, treated with soda residue, calcium residue, or commercial zinc naphthenate, showed that the latter alone was successful in decreasing greatly the amount of SO_3. Under good combustion conditions, there was no acid dew-point when burning oil containing 0.14% zinc (by weight). With 0.07% zinc, the amount of SO_3 was still very low, a dew-point of 160°F being measured. (Authors' abstract)

221

1956
FLUORIDE FOILERS. Chem. and Eng. News, v. 34, Mar. 26, 1956: 1506, 1508, illus.
DLC (TP1.C35, v. 34)

Stanford Research Institute offers a series of some 35 standardized fluoride samples based on animal and plant tissues and common minerals. These samples are especially useful for those engaged in air pollution work, or for industrial plants which face a potential fluoride effluent problem since they are derived from slags, ores, dusts, hays, etc. Each sample is available in fluoride concentrations from 5 to 1500 ppm.

222

Fonselius, S. 1954
AMINO ACIDS IN RAINWATER. Tellus, v. 6, Feb. 1954: 90. DLC (QC801.T4, v. 6)

Organic nitrogen compounds are known to exist in rainwater. They have been determined by Kjeldahl digestion in a few cases and are mentioned in the literature as albuminoid nitrogen, but previously no attempt had been made to determine their nature. Paper chromatography indicated that the residue remaining after evaporation of large quantities of snow and water probably contained the amino acids glycine and α alanine. This finding is interesting in view of the synthesis by Miller (Science, v. 117, 1953: 528) of various amino acids by electrical discharge in a closed system containing methane, ammonia, water vapor, and nitrogen.

223

Fox, L. L. 1954
SOME MEASUREMENTS ON THE SMOKE FROM OPEN FIRES. Jour. Inst. Fuel, v. 27, Aug. 1954: 385-389, illus. DLC (TP315.I6, v. 27)

Measurements have been made, for one particular coal, of the smoke in the flue gases from a stool-bottom grate, and from a smokeless-fuel grate, each installed with its own fireback. Within the range of the experiments, it was found that with both grates the amount of smoke, expressed as a percentage of the corresponding refuelling charge, was independent of the weight of that charge, and of the average burning rate of the fire. (Author's abstract)

224

Foxwell, G. E. 1955
GAS ENGINEERS AND PREVENTION OF AIR POLLUTION. Gas Jour., v. 281, Feb. 9, 1955: 377-378, 382-385. DLC (TP700.J8, v. 281)

The problems involved in the abatement of smoke from domestic chimneys, particularly in "black areas", are discussed. The most efficient means to solve these problems are the use of closed stoves burning solid smokeless fuels, the increased demand for coke being met by the carbonization of house coal, and the replacement of coke used in industrial operations by other fuels. To meet the demand for solid smokeless fuels would be a challenge to the carbonization industry. In addition, this program requires the education of the public of the economy and efficiency of smokeless fuels.

225

Foxwell, G. E. 1955
SMOKE ABATEMENT IN PRACTICE. Smokeless Air, v. 25, Summer 1955: 219-227. (Paper presented to a Joint Meeting of the Institute of Fuel, The National Smoke Abatement Society, and N.I.F.E.S., in Glasgow, Apr. 1, 1955)
DLC (TD884.S855, v. 25)

Six of the main recommendations of the report of the Committee on Air Pollution which have been accepted for incorporation into the Clean Air Act are mentioned. Some of the problems which might evolve on acceptance of these recommendations are discussed as they apply to industry, railroads, and domestic situations. Problems of domestic supply, fuel required, appliances for domestic heating, cost of smokeless fuel, quality of coke, coal supplies, and organization of a smokeless or smoke-control zone are discussed briefly.

226

Fraser, D. A. 1956
THE COLLECTION OF SUBMICRON PARTICLES BY ELECTROSTATIC PRECIPITATION. Amer. Indus. Hyg. Assoc. Quart., v. 17, Mar. 1956: 75-79. DLC

Experimental data are presented which indicate that in the submicron range smaller particles are precipitated more readily than larger particles. The theory of electrostatic precipitation processes is reviewed, and it is shown that the experimental data agree with theoretical predictions. A comparison is made between results obtained using the electron microscope and the optical microscope to explain the conflicting statements found in the literature. (Author's abstract)

227

Frenkiel, F. N. 1954
SOME NEW SCIENTIFIC TRENDS IN METEOROLOGY. Science, v. 120, Sept. 10, 1954: 408-409. DLC (Q1.S35, v. 120)

This is a short discussion of the findings of a conference, sponsored by the National Science Foundation, on the significance and possibilities of high-speed computing in meteorology and oceanography, which was held at the University of California in Los Angeles, May 13-15, 1954. High-speed computing techniques can be of assistance in testing fundamental laws of physics that are not yet well established, and can help in a major way in handling and analyzing the enormous amounts of numerical data needed to describe atmospheric motions. The application of these methods to questions of atmospheric pollution of an industrial area are discussed briefly.

228

Frenkiel, F. N. 1956
ATMOSPHERIC POLLUTION AND ZONING IN AN URBAN AREA. Scient. Monthly, v. 82, Apr. 1956: 194-203. DLC (Q1.S817, v. 82)

A general review of the field of air pollution—production, emission, transfer, contact, and damage—is given under the following subheadings: control; atmospheric dispersion of pollutants; mathematical model; relative responsibilities of pollution sources; allowable pollutant concentrations; temporary emergency measures; reduction of pollution from existing sources; air-zoning for new pollution sources; and urban planning.

229

Frenkiel, F. N., and I. Katz. 1956
STUDIES OF SMALL-SCALE DIFFUSION IN THE ATMOSPHERE. Jour. Meteorol., v. 13, Aug. 1956: 388-394, illus. DLC (QC851.A283, v. 13)

The dispersion of smoke puffs has been used as a method of measuring turbulent diffusion in the atmosphere. Some of the basic equations of turbulent diffusion as applied to the dispersion of a small-scale smoke puff are recalled. The intensity of turbulence in the lower atmosphere is then determined from the experimental measurements. The experimental measurements are analyzed to find the characteristics of turbulence as observed on a small scale. Comparison is made with other smoke-puff and soap-bubble diffusion studies. (Author's abstract)

230

Frew, S. 1956
SMOKE REDUCTION AND FUEL EFFICIENCY BY MEASUREMENT AND CONTROL. Smokeless Air, v. 26, Spring 1956: 176-180. (Paper presented at the Joint Conference of the Combustion Engineering Association and the British Industrial Measuring and Control Apparatus Manufacturers' Association, London, July 1955) DLC (TD884.S855, v. 26)

Measurements and control of various aspects of small boiler plants are discussed. The object of automatic control is to regulate automatically the heat output or steam demand. Such automatic control gives better and more efficient operation, a saving in fuel and often in labor, and an increase in safety, as well as a reduction in smoke and grit emission. (Quoted in part)

231

Froula, H. C., A. F. Bush, and E. S. C. Bowler. 1955
USE OF THERMAL PRECIPITATOR AND ELECTRON MICROSCOPE FOR EVALUATION OF AIRBORNE PARTICULATES. (Abstract). Analyt. Chem., v. 27, June 1955: 1035. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955) DLC (TP1.I615, v. 27)

Three aspects of the microscopial study of airborne particulates were considered: collection of particles; microscopy of collected samples; and interpretation of the micrographs. Of the various means devised for collecting airborne particles, this paper deals in particular with thermal precipitation, especially in regard to application to electron microscopy. A discussion was given on possibilities and limitations of the electron microscope in this field, and on its advantages and disadvantages as compared with the light microscope. Finally, consideration was given to the interpretation of micrographs especially with respect to their significance in the evaluation of atmospheric pollution. (Authors' abstract)

232

Fry, J. 1953
EFFECTS OF A SEVERE FOG ON A GENERAL PRACTICE. The Lancet, v. 264, Jan. 31, 1953: 235-236. DLC (R31.G3, v. 264)

During the London fog of Dec. 1952, there was a remarkable increase in the work of a general medical practice of 4,500 patients in the southeastern outskirts of London. The increase was noted principally in the prevalence of upper respiratory disturbances, and the more severe respiratory disorders of the lungs, with a few cases indicating irritation of the gastric mucosa. These findings are in agreement with the analysis of the effects of the Nov. fog of 1948. The most severe cases were found in the elderly, and especially in those with some previous cardio-respiratory involvement, with deaths being rare in the age groups below 45. As in the influenza epidemic of 1950-1951, there was less than the usual amount of illness among children, the several chronically asthmatic children in the practice not being affected.

233

1955
FURNACE GAS CONTROL. Safety Maintenance and Production, v. 110, July 1955: 38. DA

"New progress in controlling gases given off by open hearth steel-making furnaces was reported recently ... at the general meeting of the American Iron and Steel Institute in New York. Dr. Silverman indicated the magnitude and scope of the open hearth gas cleaning problem, and described some of the developments undertaken at Harvard .... He reported that experiments on moving filters of slag wool together with rotating screw units have shown great promise in reducing air pollution by open-hearth gases ...." (Quoted in part)

234

Gabbert, W. L. 1954
EQUIPMENT FOR THE COLLECTION OF FLY ASH, DUST, SOOT, AND SMOKE FROM THE FLUE-FED INCINERATOR. Air Repair, v. 4, Nov. 1954: 119-123. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Air cleaning equipment commercially available will remove with high efficiency the coarser solids causing public-nuisance complaints and consisting of fly ash, dust and soot. The addition of low-voltage, air-filter type of electrostatic precipitators with precleaning filters will remove practically all visible smoke, where the additional equipment and maintenance costs are justified. Condensation of grease vapors during cold operation must be considered in colder climates. Wet type collection equipment is not affected by such condensation, although plugging of fabric media is indicated unless expensive precautions are taken. Temperature fluctuations and ranges, dust loadings and operation records have been compiled during a 2-yr test on a typical 14-floor flue-fed incinerator. (Public Health Eng. Abstract, v. 35, Jan.-Feb. 1955: 2)

235

Galegar, W. C. 1955
FEDERAL ASSISTANCE IN STUDYING AIR POLLUTION PROBLEMS. Oklahoma Agric. and Mech. College, Stillwater. Eng. Exper. Sta. Publ., v. 23, Dec. 1955: 75-78 (no. 97) (Paper presented to the Industrial Wastes Conference of Oklahoma Water, Sewage and Industrial Wastes Conference, Stillwater, Oct. 5 and 6, 1955) DBS

The air pollution research programs provided for by Public Law 159 - 84th Congress, Chapter 360 - 1st session, S. 928 are to be administered from the Robert A. Taft Sanitary Engineering Center under the divisions of: (1) chemical research and development; (2) engineering research and development; (3) instrument and methods development; (4) meteorology; and (5) state and community services.

236

Gallear, C. A. 1955
DUST COLLECTING SYSTEM IN SINTERING PLANT REDUCES COST. Blast Furnace and Steel Plant, v. 43, Dec. 1955: 1381-1382, illus. DLC (TN1.B7, v. 43)

A dust reclamation system installed at a large Pennsylvania steel mill brought about a monthly saving of about $1500. It is reported to have an over-all efficiency of 92.5% (% by weight of particles removed from combustion gases before exhausting to the atmosphere), and to have resulted in the collection of some $700 worth of sinter monthly. The major cost is for the electricity used in operating the 1000-hp motor that drives the 14-ft, 750-rpm fan which draws air through the sinter bed and dust collector. Low maintenance costs result from the minimum of upkeep of the refractory lining of the collectors. The dust collector itself is comprised of 6 cyclone-type units arranged in the shape of a large "V", with each cyclone receiving an equal portion of the nearly 85,000 cu ft/min of exhaust gas from the sintering machine.

237

Gartrell, F. E., 1955
and S. B. Carpenter
AERIAL SAMPLING BY HELICOPTER: A METHOD FOR STUDY OF DIFFUSION PATTERNS. Jour. Meteorl., v. 12, June 1955: 215-219, illus. DLC (QC851.A283, v. 12)

A method for sulfur dioxide air pollution sampling, utilizing a continuous analyzer and recorder operated in a helicopter is described. This method was developed to overcome many of the limitations of conventional sampling methods encountered in diffusion studies at one of the large coal-fired steam-electric plants in the Tennessee Valley Authority power system. (Authors' abstract)

238

1956

GAS CHROMATOGRAPHY GROWING. Chem. and Eng. News, v. 34, Apr. 9, 1956: 1692-1696. DLC (TP1.C35, v. 34)

This article reviews the development, procedures, and uses of elution-partition and absorption-displacement chromatographic techniques and equipment in analytical, process, and research activities. The equipment is applicable to process-monitoring, and has been used to detect as little as 0.005% of a trace component.

239

1955

GAS DENSITY BALANCE. Analyt. Chem., v. 27, Nov. 1955: 58A. DLC (TP1.I615, v. 27)

This gas density balance is designed to measure the density of a sample gas by a null balance principle. A rotational force about a quartz fiber support is created by a small dumbbell as it responds to density changes. The magnitude of the force is proportional to the density of the gas. A 95% response for samples as small as 10 cc is obtained in less than 1 min.

240

1956

GAS DENSITY RECORDER. Instrument Review, v. 3, Feb. 1956: 41. DLC

"This apparatus, recently introduced into this country [England] for the recording of absolute gas density, works on the buoyancy principle in which the lifting force of a displaced element, which is dependent on the density of the gas, is measured. The device is fitted in a gas-proof chamber through which passes the gas to be tested. The deflection of the balance is transmitted by means of a magnetic coupling from the gas chamber to the indicating and recording device outside. The recording is effected in dots by means of a drop bow, whereby the position of the indicator is impressed at regular intervals of 30 sec by means of a ribbon on to the moving paper strip which has an available width of 110 mm." (Quoted in full)

241

1956

[GAS-LIQUID ANALYZER]. Science, v. 123, Apr. 20, 1956: 683. DLC (Q1.S35, v. 123)

"The Fischer Scientific Co.'s partitioner makes automatic qualitative and quantitative analyses of gases and volatile liquids by gas-liquid partition chromatography. The instrument has a 14-ft thermostatted chromatographic column to resolve each mixture into its components, and a built-in automatic integrator simultaneously computes and records a number proportional to the quantity of the component making the peak. The instrument is designed for identification of hard-to-differentiate trace impurities in solvents; on-the-spot analysis of fuels, flue and other plant-effluent gases, mine gases, air pollution, and smog; and quality control of foods, beverages, spices, tobacco, and perfumes. The partitioner, with 0.01- to 0.03-ml samples of liquid or 0.3- to 0.6-ml samples of gas, can be used to make an analysis of a multicomponent system in minutes, whereas distillation would require hours or days." (Quoted in full)

242

Gaughan, J. E. 1956

OZONE CRACKING OF NATURAL AND SYNTHETIC RUBBERS. Rubber World, v. 133, Mar. 1956: 803-808, illus. DLC (TS1870.I4, v. 133)

A condition of rubber deterioration known as weather- or sun-checking has now been shown to be caused almost exclusively by the ozone content of the air. Chemical antiozonants have now been developed which offer protection to GR-S type rubbers against such checking.

243

Gerhardt, P., Jr. 1957

CHICAGO COMPLETES FIRST OF FOUR INCINERATORS. Amer. City, v. 72, Jan. 1957: 96-98, illus. DLC (HT101.A5, v. 72)

The design and operation of the first of Chicago's 4 large refuse incinerators are discussed. A mechanically-operated, inclined-grate type of stoker is used. The furnaces each have a design capacity of 180 tons/24 hr; this 720 tons means about 3,600 cu yd of mixed refuse of which only about 3% is actual garbage. The primary combustion areas of the furnaces are divided into 3 units of grates providing mutual assistance by having gases emitted at the end cell. A water spray in each furnace provides an additional safeguard against high dust-stack emission. A 30,000 cu ft/min forced-draft fan with variable speed controls serves each furnace. A vacuum system with 3-in. hose connections facilitates the removal of fly ash from the interior of each furnace. Each chimney serves 2 furnaces through a common breeching, with a main damper for each furnace. There is a system of spray nozzles along the upper edge of the storage pit to control dust while dumping. Visual test reports indicate less than a half Ringelmann during normal operation without sprays. The dust loadings, however, are believed to be somewhat over the generally accepted limitations. The water sprays and forced draft produce better than 50% improvement in dust-loading conditions of stack emission, but also produce a more noticeable vapor plume that is quite deceptive. The carbon dioxide content of flue gases averages 2.8%, and volumetric tests reveal a range of 11.04 to 13.93 lb of flue gas/lb of refuse consumed, indicating efficient operation. Experiments show that direct impingement of furnace gases on a wet surface is a most effective manner of removal of dust particles from the gases. (Quoted in part)

244

Gibb, J. G., 1953
P. D. Ritchie, and J. W. Sharpe.
PHYSICOCHEMICAL STUDIES ON DUSTS. VI. ELECTRON-OPTICAL EXAMINATION OF FINELY GROUND SILICA. Jour. Appl. Chem., v. 3, May 1953: 213-218, illus. DLC (TP1.S612, v. 3)

Finely-ground silica particles are being studied on the theory that these airborne particles are the cause of silicosis. Changes in surface structure brought about by removal of the high-solubility layer from crystalline-quartz and fuzed-silica (Vitreosil) dusts by 40% hydrofluoric acid, and from Lochaline-sand dust by a borate buffer (pH 7.5), are studied by electron-optical methods. The changes in electron-diffraction pattern show that the original surface layer is amorphous (estimated mean thickness, 0.03-0.06 microns); for quartz and Lochaline-sand dusts there is some evidence of an intermediate layer of minute crystallites between the amorphous layer and the crystalline core. (Authors' abstract)

245

Giever, P. M. 1952
PROBLEMS ENCOUNTERED IN FIELD USE OF THOMAS AUTOMETER. Arch. Indus. Hyg. and Occupat. Med., v. 6, Nov. 1952: 445-449.
DLC (RC963.A14, v. 6)

A mobile analytical laboratory unit, containing an automatic Thomas autometer for recording the sulfur dioxide content of the air, is described including some of the problems encountered in its construction and operation. The autometer uses an electric power source, and functions at an operating temperature of 120°F. The latter condition is obtained by warming the laboratory unit with a gasoline heater. Plans for building the mobile laboratory may be obtained from the Division of Occupational Health, 1014 Broadway, Cincinnati 2, Ohio.

246

Gilbert, J. A. S., 1955
and A. J. Lindsey.
THE DETERMINATION OF THE AMOUNT AND DISTRIBUTION OF ATMOSPHERIC SMOKE POLLUTION BY ANALYSIS OF SNOW. Chem. and Indus., [1955], no. 45, Nov. 5, 1955: 1439-1440.
DA

In order to investigate pyrene, a hydrocarbon from coal tar, as a smoke-pollution indicator, snow samples were collected simultaneously at various stations in the London area, during a steady snowfall. Included were specimens from places unlikely to be contaminated by local emissions. The geographical distribution of pyrene, plotted on a map from the snow-sample data, is that which might be expected from the location of smoke-emitting sources and prevailing winds.

247

Gilbert, P. T. 1953
THE EFFECT OF IMPURITIES IN THE METAL ON THE RATE OF CORROSION OF ZINC AND GALVANIZED COATINGS IN THE ATMOSPHERE. Jour. Appl. Chem., v. 3, Apr. 1953: 174-181, illus. DLC (TP1.S612, v. 3)

During the course of exposure tests carried out by the British Nonferrous Metals Research Assoc., a considerable amount of evidence has been accumulated about the resistance of zinc and zinc-coated steel to atmospheric corrosion at Euston (industrial atmosphere), Cambridge (urban atmosphere), and Brixham (marine atmosphere). Results of the tests are summarized under 2 headings: (1) the effect of additions to the galvanizing bath on the corrosion-resistance of hot-dipped coatings, and (2) the behavior of rolled zinc sheets of differing purity. In general, the effect of impurities in the metal on the rate of corrosion was slight; however, zinc-2%-copper alloy sheet corroded less than pure zinc sheet. The life of galvanized coatings in an industrial atmosphere is proportional to the thickness of the coating for coatings between 1 and 3 oz/sq ft. In industrial and urban atmospheres, specimens on which airborne pollutants could directly impinge were attacked to a greater degree than specimens partly sheltered from horizontally-moving particles. (Author's abstract in part)

248

Glasser, L. G. 1955
AUTOMATIC PHOTOELECTRIC ULTRAVIOLET ANALYZER FOR CONTINUOUS CHEMICAL ANALYSIS OF PROCESS STREAMS. Jour. Opt. Soc. Amer., v. 45, July 1955: 556-563.
DLC (QC350.06, v. 45)

An automatic photoelectric analyzer has been developed for recording the concentration of an ultraviolet-absorbing component in a nonabsorbing mixture of liquids or gases. Radiation sources, filters, and phototubes are interchangeable to provide various monochromatic radiations, or a simple monochromator can be attached to provide any wavelength from 220 to 1200 millimicrons. The concentration range of the analyzer can be selected by choice of interchangeable cells of lengths from 0.001 to 7.5 in., and by choice of shutters of various absorbance ranges in an optical balancing system. The absorbance range is usually restricted to values between 0.01 and 0.2. High concentrations or concentrations in ppm can be recorded, and several typical applications are listed. (Author's abstract in part)

249

Glauberman, H., 1956
and A. J. Breslin.
THE GENERATION OF A SOLID SUBMICRON TEST AEROSOL. Amer. Indus. Hyg. Assoc. Quart., v. 17, Dec. 1956: 401-404, illus. DLC

A simple and compact solid particle generator has been designed for use as a standard test instrument to measure the dust retention of filter media. The fume is generated from uranium chips burned in an argon and oxygen gas stream, uniformity being maintained by moving the chips through the gas stream on a slowly rotating wire mesh bed. Some of the desirable attributes of the generator are the production of 0.05-micron to 0.2-micron solid particles; sustained generation; reproducible concentration; and reproducible and selectable size spectra; and the aerosol produced lends itself to easy measurement in minute quantities.

250

Goetz, A. 1956
THE APPLICATION OF THE CONCENTROMETER PRINCIPLE TO THE DETERMINATION OF AEROSOLS. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 72-76, illus. DLC

This method provides the following improvements in the quantitative assay of aerosols: (1) rapid sampling; (2) determination of the concentration of the particulate matter without mass determinations; and (3) reduction of denaturation in microscopic evaluations of particles. The method is based on the passage of a suspension of the particles through a filter material, which collects the material quantitatively on the surface. The membranes used were stable gels of cellulose esters with a flow velocity as high as 30 cm/min. A schematic illustration of the method used to convert the aerosol into a liquid suspension is shown. Mathematical expressions for the determination of the concentration, particle size, and particle number/unit volume are presented. This method is also applicable to the measurement of specific molecular components present in minute concentrations in the air.

251

Golding, W. E., 1955
and A. W. Ellis.
AN IMPROVED APPARATUS FOR THE QUANTITATIVE ABSORPTION OF GASES IN LIQUIDS. Chem. and Indus., no. 41, Oct. 29, 1955: 1401-1402, illus. DLC (TP1. S6332, no. 41)

An apparatus designed to remove trace quantities of impurities from gas streams is illustrated. Gas entering the inlet tube forces the absorbent into a central tube from which the absorbent sprays over glass balls in the chamber. The contaminated gas following the absorbent flows over the balls and comes into direct contact with a large absorbing surface area. The system will operate at flow rates up to 6 l/min with an efficiency close to 100%.

252

Goldman, A. 1956
THE ODOR PHASE OF AIR POLLUTION. Indus. Wastes, v. 1, July-Aug. 1956: 217-220, illus. DLC

The problem of objectionable odors is now considered to rank fourth in importance by air pollution officials. Although there is question as to whether odors cause damage to health, there is no question that they cause property values to decrease, and are a great nuisance to nearby residents. In the field of odor perception there are 4 facts of primary importance that chemical analysis alone does not take into consideration: (1) weak odors are not perceived in the presence of strong ones; (2) odors of the same strength sometimes blend to produce a combination in which one or both of the components are unrecognizable; (3) in the presence of odors of constant intensity, awareness of any odor at all is rather quickly lost; and (4) like and dislike for any odor depends largely on association of the scent with pleasant or unpleasant experiences and impressions of the past. Odor masking makes odors more acceptable psychologically by the admixture of other odorants. Certain pairs of odors in appropriate concentrations are antagonistic, and when sniffed together the intensity of each odor is diminished; this is counteraction. Odor counteractants have been used successfully in rendering plants. Evaluation of the odor level can be made by means of a machine known as an osmometer; in some cases an odor jury, trained to give objective observations, is useful.

253

Goodale, T. C. 1952
B. M. Carder, and E. C. Evans.
DUST PARTICLES IN HIGH VELOCITY AIR STREAMS; REPRESENTATIVE SAMPLING. Amer. Indus. Hyg. Assoc. Quart., v. 13, Dec. 1952: 226-231, illus. DLC

An aerosol sampler for obtaining samples over a wide range of altitudes and air velocities during airflight is described. The inlet is mounted and vaned to maintain its axis parallel to airflow lines, the sampler being designed to maintain the airflow into the inlet isokinetic with the flow of the airstream. The aerosol particles are precipitated electrostatically on glass slides, electron-microscope screens, and selected metallic surfaces.

254

Goodwin, G. C. 1952
DUST REMOVAL FROM BOILER FLUE GASES. Chem. and Process Eng., v. 33, Apr. 1952: 198-199. DLC (TP1. C355, v. 33)

Three methods of removing dusts from waste gases are described: (1) oxides of sulfur may be removed by washing the waste gases in a single operation, or after the coarse particles are removed by a centrifugal collector; (2) centrifugal collectors separate dusts by a spinning force exerted by the gases entering tangent to the system; and (3) in electrostatic precipitators, dusts pass between charged plates, become electrically charged, and are then attracted to an oppositely charged pole.

255

Gordieyeff, V. A. 1956
ADSORPTION OF GASES AND VAPORS ON AEROSOL PARTICULATES. Amer. Indus. Hyg. Assoc. Quart., v. 17, Dec. 1956: 411-417. DLC

This study is concerned, on a broad physiochemical basis, with the mechanism of adsorption of vapors by airborne porous particles. A separate investigation on the effect of adsorption of toxic vapors by aerosols on the toxicity of the inhaled atmosphere is also reported briefly. It is estimated that unless the toxic atmosphere is practically saturated with the toxic vapors, and the carrier aerosols are monodispersed and very fine, the amount of vapor adsorbed on the carrier particles does not significantly change the penetrating power of the vapor. It is believed that any such changes attributed to acute toxicity of vapors upon addition of dust particles, should be attributed to physiological, pharmacological, or other physical effects of the dust rather than to its adsorptive action. Changes in the humidity of the inhaled atmosphere seem to have a more profound effect than does the presence or absence of an adsorptive aerosol.

256

Gordon, M. T., 1954
and C. Orr, Jr.
THERMAL PRECIPITATION IN AIR POLLUTION STUDIES. Air Repair, v. 4, May 1954: 1-4, 39. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

An aerosol sampler is described which utilizes thermal precipitation. The aerosol enters the sampler through a central tube and flows radially outward between heated and cooled surfaces. Aerosol material is deposited on the cold plate as an annular ring whose outer diameter is a function of the operating conditions, and the physical properties of the aerosol. The deposit may be examined by optical microscope. An equation is given relating aerosol flow rate, sampler dimensions, and maximum particle penetration with particle density, particle diameter, particle thermal conductivity, physical properties of the gas, and thermal gradient. The device may be used in air pollution studies, sampling radioactive particles, and for viable organisms.

257

Grandjean, E., 1956
H. Turrian, and J. L. Nicod.
THE FIBROGENIC ACTION OF QUARTZ DUSTS: BIOLOGICAL METHODS FOR THEIR QUANTITATIVE EVALUATION IN RATS. Arch. Indus. Health, v. 14, Nov. 1956: 426-441, illus.
DLC (RC963.A14, v. 14)

Fibrosis was studied in rats after introduction of dust suspensions by either intraperitoneal, intratracheal, or intramesenterial methods. Results indicate that although the methods offer the possibility of estimating quantitatively the fibrogenic activity of a dust, each was found to have certain limitations. In the intraperitoneal and intratracheal methods, some of the disadvantages were: the relatively wide variance shown by the measured values; the safety limits of the $E.D._{50}$ and the standard deviation of lung weights was considerable; in neither method was there a useful relationship between extent of fibrosis and size of the dose applied. In the intramesenterial method, it is possible to determine the relationship of the experimental fibrosis to the applied dose and to the duration of the test; however, this method has the disadvantage of requiring a surgical procedure, a delicate injection technique, and a need to limit the liquid injected to not more than 0.02 cc of liquid/blister. The phenomena of greater fibrosis being produced by mixtures of quartz and inert dusts over that produced by quartz dusts alone, is not revealed so clearly by this latter method. Histological examinations of tissues have shown changes similar to those found in human silicosis.

258

Gray, E. L., 1952
J. K. MacNamee, and S. B. Goldberg.
TOXICITY OF NO_2 VAPORS AT VERY LOW LEVELS. Arch. Indus. Hyg. and Occupat. Med., v. 6, July 1952: 20-21. DLC (RC963.A14, v. 6)

Groups of rats were exposed to inhalation of the vapors of red fuming nitric acid having a NO_2 content from 9 to 14 ppm. The length of exposure varied from a total of 40 hr to 96 hr, over a period of 10 to 24 days. Animals examined shortly after exposure exhibited an inflammatory condition throughout the entire respiratory tract, with the upper portion of the tract being more severely affected. In animals killed 8 or more weeks after exposure, the inflammatory process had subsided but there were localized areas of emphysema in all lobes of the lungs. No differences were seen in the changes produced after 40 hr, and those after longer periods of exposure. It was concluded that amounts of NO_2 over 8 ppm produce damage in rats, and may cause injury to man. Also, on the basis of this information, the MAC of 25 ppm would appear to be too high.

259

Graydon, S. W. 1952
ATLANTA'S ENLARGED INCINERATOR. Amer. City, v. 67, July 1952: 94-95.
DLC (HT101.A5, v. 67)

Atlanta, Ga. is using a new Danish incinerator which seems to burn efficiently, produce much steam, and operate economically at a capacity of 165 tons/day. Recently added to this were 2 units, each operating at 175 tons/day capacity. New features are an automatic ash-handling system and plant-air purification installation.

260

1954
A GREAT TASK. Gas World, v. 140, Dec. 4, 1954: 1405-1408. DLC (TP700.G2, v. 140)

The main aspects of the Air Pollution Committee's Report are given and discussed. It is indicated that coal-fired locomotives, motor vehicles, and power stations contribute to air pollution. By the use of appliances designed to burn smokeless fuels, the discharge of smoke could be reduced about 30-35%. Smokeless zones are proposed for residential districts and smoke-controlled areas for industrial concentrations. The coke suggested for use in smokeless areas would have to be a high quality free-burning fuel. In addition to coke, gas and electricity are suggested as heat and power sources.

261

Greeley, S. A. 1956
BACKGROUND OF DESIGN CRITERIA FOR MUNICIPAL INCINERATORS – THE DESIGNER'S VIEW. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 133-138, illus. (Excerpts from a paper presented at the Semiannual Meeting, American Society of Mechanical Engineers, Cleveland, Ohio, June 17-21, 1956). DLC

The criteria for the design of municipal incinerators are discussed in some detail, including some of the facilities to be used for air pollution control. It is stated that "ample operating experience permits sound bases of design to accomplish satisfactory results with good economy and ample competition, except in some aspects of facilities to reduce air pollution. In this part, there is not as yet a sufficient amount of operating data to permit a realistic adjustment of costs and results in operation to the needs of the receiving airway. Therefore, simpler and less costly facilities arranged for later additions, if needed, are recommended. Present experience suggests subsidence chambers can be designed to avoid undesirable air pollution. There is no ground to assert that municipal refuse incinerators should not be built because of inability to operate without undue air pollution." (Quoted in part)

262

Greenburg, L., 1955
and M. B. Jacobs.
CORROSION ASPECTS OF AIR POLLUTION. Amer. Paint Jour., v. 39, July 11, 1955: 64-78. DLC (TP934.A53, v. 39)

Corrosion is considered to be a destruction of materials by chemicals or electrochemical reactions, the rate of which depends on: (1) the purity and surface condition of the material attacked; (2) the atmospheric conditions; and (3) the season of the yr. Corrosive agents may be classified as oxygen and oxidants, acidic materials, salts, and alkalies. Data for the concentrations of acidic materials in the atmosphere during one day, and for average monthly concentrations measured in the mornings and afternoons are tabulated. It is believed that corrosion caused by salts is actually the result of hydrolysis of salts of strong acids and weak bases to yield strong acids.

263

Greenburg, L., 1956
and M. B. Jacobs.
AIR POLLUTION CONTROL: HEALTH ASPECTS AND MICROTECHNIQUES. Trans. New York Acad. Sci., ser. 2, v. 18, Feb. 1956: 289-297. DCU

Recent incidents relating air pollution to health problems are briefly reviewed. These incidents include the well-known London and Donora cases, as well as the occurrence in Poza Rica, Mexico. A description of the micro- and ultratechniques for air pollution analyses used by the New York City Dept. of Air Pollution Control is presented. The collecting procedures referred to include sampling, deposition, adsorption, filtration, condensation, and absorption. Analytical procedures pertaining to sulfur dioxide, sulfur trioxide, carbon monoxide, nitrogen oxides, ammonia, aldehydes, cyanides, fluorides, ozone, hydrogen sulfide, lead, and hydrocarbons are cited.

264

Greenwald, I. 1954
EFFECTS OF INHALATION OF LOW CONCENTRATIONS OF SULFUR DIOXIDE UPON MAN AND OTHER MAMMALS. Arch. Indus. Hyg. and Occupat. Med., v. 10, Dec. 1954: 455-475. DLC (RC963, A14, v. 10)

The literature on the effects of the inhalation of low concentrations of sulfur dioxide and of sulfuric acid upon man and mammals is reviewed. Species differ greatly in susceptibility, with rats the most resistant, guinea pigs (especially those 1 to 2 months old) the least, and man even more sensitive than the latter. Continued exposure of animals to high concentrations (100 to 500 ppm) of sulfur dioxide lowered their resistance to infection and lessened the formation of antibodies. Concentrations of sulfur dioxide up to 5 ppm or of sulfuric acid at about 1 mg/cu m are not found objectionable by normal healthy individuals although concentrations of 1 ppm and 0.5 mg/cu m, while not detectable, do alter the respiratory pattern. Reasons are given for regarding as probably excessive for prolonged exposure, the present maximum allowable concentration of 10 ppm of sulfur dioxide. However, the possibility of injury to the very young, old, or ill persons from sulfur dioxide in concentrations of 5 ppm or lower or from simple fog should be further investigated. Sulfur dioxide and sulfuric acid as the cause of the episodes in the Meuse Valley, Donora, and London can neither be completely confirmed nor denied.

265

Griffith, R. H. 1952
THE CATALYTIC OXIDATION OF ORGANIC SULPHUR COMPOUNDS IN COAL GAS. Gas World, v. 136, Aug. 16, 1952: 398-401.
DLC (TP700. G2, v. 136)

It is desirable that the amount of organic sulfur compounds in coal gas does not exceed 10 grains of sulfur/100 cu ft of gas. The sulfur compounds usually found in the gas are carbon disulfide, carbon oxysulfide and thiophen. The chemistry of a catalytic oxidation process using a nickel sulfide as the catalyst is discussed, and various figures and diagrams showing the plant operation are explained. The first reaction in the process is an exothermic one which provides the heat required for the remainder of the process. After final treatment, the purified gas contains about 5 grains of sulfur/100 cu ft of gas. The catalyst remains active for about 3 or 4 months, and can be regenerated by controlled oxidation and reactivation of the nickel oxide - nickel sulfate mixture.

266

1955
GRIT ARRESTER. Instrument Rev., v. 2, Nov. 1955: 188
DLC

"A device has recently been introduced for the removal of the larger particles of grit from flue gases. The arrester is located at the top of a circular chimney of inside diameter up to 3 ft, the grits being brought down to ground level by means of 4-in. diameter metallic pipes. The annulus of the device has a gradually increasing outer diameter and a more rapidly increasing inner diameter and is designed to have a constant cross-sectional area throughout its height not less than the cross-section of the chimney. Two helixes formed around the cone give the gases a swirling motion during their upward passage. The grits, being heavier than the gases, are concentrated to the outer wall of the annulus, are caught by a deflector ring as they emerge, and fall into a surrounding chamber in which the conditions are static. The deflector ring does not impede the flow of relatively grit-free gases into the atmosphere.' (Quoted in full)

267

Gross, P., 1956
M. L. Westrick, H. H. Schrenk, and
J. M. McNerney.
THE EFFECTS OF A SYNTHETIC CERAMIC FIBER DUST UPON THE LUNGS OF RATS. Arch. Indus. Health, v. 13, Feb. 1956: 161-166, illus.
DLC (RC963. A14, v. 13)

Fine (0.02 to 0.06 micron) or coarse (0.7 to 0.8 micron) particle dusts of a ceramic fibrous material, Fiberfax, as well as those from quartz, feldspar, and limestone, were injected intratracheally in an aqueous suspension into mice. The ceramic fiber dust produced no lesions comparable with those of either silica or feldspar. The lesions did not appear to be of any greater severity than those produced by limestone dust which is generally considered to be inert and harmless. The studies indicate that the lungs are capable of clearing themselves surprisingly well of the injected coarser material.

268

Gucker, F. T., Jr., 1955
and D. G. Rose.
DESIGN OF AEROSOL PARTICLE COUNTERS. (Abstract). Analyt. Chem., v. 27, June 1955: 1035. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955)
DLC (TP1. I615, v. 27)

Two different optical systems for photoelectric aerosol counters have been used, employing forward-angle scattering, and right-angle scattering. The possibility of applying these counters to particle-size determination has led to a theoretical investigation of the most suitable optical system. We have considered: (1) parallel illumination of the particle with a viewing lens of definite aperture at any arbitrary angle to the axis of illumination; (2) convergent illumination with a viewing lens at any arbitrary angle, particularly 90°, to the axis of illumination; and (3) convergent darkfield illumination with the viewing lens placed within the dark cone of the illuminating beam. The last 2 systems have the advantage of allowing increased intensity of illumination. With monochromatic light, the first and second show several plateaus of the response curve even below 0.5-micron radius, while the third gives an output pulse increasing monotonically with particle size over a larger radius. Although increase in the aperture of the collecting lens and the use of white light tend to smooth out these irregularities, the forward-angle scattering system offers definite advantages whenever the size of the output pulse from the particle is to serve as a basis for the determination of size distribution. Use of light of several wave lengths may extend the usefulness to cover the range from 0.25- to 2.5-micron radius for dioctyl phthalate particles of refractive index 1.50. (Authors' abstract in part)

269

Gunther, J. K. 1955
ELECTRONIC AIR CLEANER ELIMINATES PRODUCT DISCOLORATION PROBLEM. Food Processing, v. 16, Oct. 1955: 84-85.
DLC (TP373. F55, v. 16)

A battery of 30 electrostatic cells containing pairs of parallel metallic charged plates was installed to clean the air used in drying a vegetable protein whipping agent. A charged wire between the plates charges any particles in the air, and these particles are attracted to the plates.

270

Gurel, S., 1955
S. G. Ward, and R. L. Whitmore.
STUDIES OF THE VISCOSITY AND SEDIMENTATION OF SUSPENSIONS. III. THE SEDIMENTATION OF ISOMETRIC AND COMPACT PARTICLES. Brit. Jour. Appl. Phys., v. 6, Mar. 1955: 83-87. DLC (QC1.I548, v. 6)

Theoretical and experimental considerations are given to show the proportionality between the sedimentation of a body, and its dimension, its velocity, and the viscosity of the medium. The effects of changes in shape and size of particles on the settling velocity are tabulated, and an equation is derived for the calculation of the settling velocity within ±2%.

271

Gutman, F., 1955
and K. Weiss.
BLENDED FUEL EXHAUST GAS. Automobile Engineer, v. 45, Oct. 1955: 415-417.
DLC (TL1.A66, v. 45)

Exhaust gases from the incomplete combustion of fuels are analyzed by a thermal conductivity gas analyzer operating on the basis that the thermal conductivity of hydrogen is 7 times that of nitrogen and oxygen, and carbon dioxide is 2/3 that of nitrogen. The analyzer consists of equipment to measure the amount of fuel used, the time necessary to burn the fuel, the volume of air consumed, and the engine speed. The sampling tube is located in the exhaust pipe in direct line with the flow of the exhaust gases. Tabular data and graphs of the resulting analyses are given.

272

Guy, A., 1953
and L. D. Wilson.
POLAROGRAPHIC METHOD FOR DETERMINING CHLORIDES IN AIR. Amer. Indus. Hyg. Assoc. Quart., v. 14, Mar. 1953: 50-53. DLC

A method for collection of chloride fumes by electrostatic precipitation using filter paper as the collecting surface is described. Subsequent pulping of the paper in 0.1 N nitric acid followed by direct polarographic measurement against a saturated mercurous sulfate reference electrode in a H-cell complete the determination. The over-all procedure is of great practical importance to the industrial hygienist since it eliminates the necessity for transporting cumbersome equipment. (Authors' abstract in part)

273

Haagen-Smit, A. J. 1952
CHEMISTRY AND PHYSIOLOGY OF LOS ANGELES SMOG. Indus. and Eng. Chem., v. 44, June 1952: 1342-1346. DLC (TP1.I6, v. 44)

Atmospheric contamination in the Los Angeles, Calif. area is characterized by crop damage, eye irritation, reduced visibility, and rubber cracking. A metallic sheen or oiliness on the under side of the leaves of test plants was attributed to the products of the interaction of various pollutants in the air. A series of oxidation reactions with hydrocarbons are tabulated showing the degree of eye irritation experienced. It is estimated that up to 2000 tons of hydrocarbons, and 300 tons of nitrogen oxides are emitted in the Los Angeles area from combustion reactions. These, combined with the 15 different organic acids which were separated chromatographically from air samples, form an oily aerosol which is responsible for the reduced visibility during heavy smog. From rubber cracking tests, 0.22 ppm of the total oxidant concentration of 0.6 ppm was attributed specifically to ozone. A schematic diagram of the reactions among pollutants, and the resulting smog symptoms are presented.

274

Haagen-Smit, A. J., 1953
C. E. Bradley, and M. M. Fox.
OZONE FORMATION IN PHOTOCHEMICAL OXIDATION OF ORGANIC SUBSTANCES. Indus. and Eng. Chem., v. 45, Sept. 1953: 2086-2089.
DLC (TP1.I6, v. 45)

A chemical characteristic of Los Angeles, Calif. smog is its oxidizing effect; oxidants, present in concentrations of 0.6 ppm, have been measured by various colorimetric methods. The oxidizing effect is attributed to a combined action of nitrogen oxides, peroxides, and ozone, counteracted by the reducing action of sulfur dioxide. Ozone and sulfur dioxide are present in concentrations of 0.3 and 0.1-0.2 ppm, respectively. Data for the formation of ozone as determined by rubber cracking are tabulated. The simultaneous presence of hydrocarbons and nitrogen oxides accounts for the high ozone content.

275

Haagen-Smit, A. J., 1955
and M. M. Fox.
PHOTOCHEMICAL OZONE FORMATION WITH HYDROCARBONS AND AUTOMOBILE EXHAUST. Air Repair, v. 4, Nov. 1954: 105-108, 136.
DLC

See 1955
Haagen-Smit, A. J.,
and M. M. Fox.
AUTOMOTIVE EXHAUST AND OZONE FORMATION. S.A.E. Trans., v. 63, 1955: 575-580. (Paper presented at the S.A.E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955)
DBS

276

Haagen-Smit, A. J., 1955
and M. M. Fox.
AUTOMOTIVE EXHAUST AND OZONE FORMATION. S.A.E. Trans., v. 63, 1955: 575-580. (Paper presented at the S.A.E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955) DBS

The concentrations of nitrogen dioxide and hydrocarbon at which photochemical ozone formation takes place have been determined, using 3-methylheptane as a standard hydrocarbon. n-butane, n-pentane, n-hexane, n-heptane, n-octane, n-nonane, n-hexene-1, and diisobutylene showed similar behavior. The ozone formed was determined by rubber cracking and by chemical means. No ozone formation was found with methane, ethane, propane, or 2, 2, 3-trimethylbutane (triptane). Experimental proof of the ozone-generating capacity of automobile-exhaust gases from the cruising and accelerating phases of automobile operation was shown. Exhaust gases from idling and deceleration phases formed ozone photochemically after addition of nitrogen dioxide. The concentrations of ozone formed, as well as the concentrations of exhaust gases used, are of the same order as those measured in the Los Angeles atmosphere. These investigations show that automobile exhaust gases are capable of forming ozone in the air, and are therefore to be considered as a definite smog source. The control of nitrogen oxide and hydrocarbon is emphasized. Results are presented in graphs and tables. (Authors' abstract)

277

Haines, G. F., Jr., 1954
and W. C. L. Hemeon.
A NEW METHOD FOR STACK DUST SAMPLING. Air Repair, v. 4, Nov. 1954: 165-169. (Paper presented at the Semiannual Meeting of the American Society of Mechanical Engineers, Pittsburgh, Pa., June 22, 1954) DLC

Based on the observation that appreciable departure from isokinetic sampling can be tolerated, stationary and rotating-rake manifold samplers were devised which can be used for sampling in vertical and horizontal ducts. Dust distribution experiments show that a high proportion of the total dust loading may be in a layer 0.5 in. thick adjacent to the wall of a quadrant of a vertical duct, and that dust creeps along the bottom of a horizontal breeching. To overcome these factors of low efficiency in sampling, baffles may be used. The baffles cause the dust to be resuspended in the gas stream, and thus insure more uniformity in the sampling. Data are presented to show that these manifold sampling devices are adequate for stack sampling particularly since one series of tests was performed in a boiler plant representing such unfavorable sampling conditions as a horizontal duct, low gas velocity, and no straight run. Use of the velocity approach method avoids errors caused by large particle stratification. The adjustment of the average nozzle velocity in the manifold assembly to the average velocity prevailing in the gas stream being tested will nullify the positive and negative errors in sampling the finer dusts. A net error can be expected where there is extreme distortion in the distribution of the fine dust. (Public Health Eng. Abstracts, v. 35, Mar. 1955: 4)

278

Halverson, W. L. [1952]
AIR POLLUTION AND THE STATE DEPARTMENT OF PUBLIC HEALTH. In California. Legislature. Assembly. Interim Committee on Air and Water Pollution. Final Summary Rep., [Sacramento], Assembly of the State of California, [1952], p. 102-106. DLC (TD425.C315)

Air pollution in California as it affects public health is discussed, and the program and policies of the State Department of Public Health in the field of air pollution are outlined. The law enacted in 1947 in the State Legislature for the control of air pollution is comprehensive in intent and broad in scope. Although it provides for the establishment of control districts in all of the counties of the State, it does not provide for any agency to assume responsibility for air pollution control. It is pointed out that public health may be affected by air pollution as follows: offensive odors are created; eye- and respiratory-passage irritation occur; toxic effects on the human body are caused; reduction of sunlight, and therefore ultraviolet light results; reduction of visibility occurs; allergic conditions such as hay fever and asthma are aggravated; and certain infections are conveyed by dusts in the atmosphere, e.g., coccidioidomycosis and possibly Q fever. As a result, activities of the Department have been 3-fold: review of the status and progress of air pollution problems in the State; guidance and assistance to local health departments in the study and correction of pollution problems; and the maintenance of an industrial hygiene program which is directed primarily toward the control of atmospheric contamination in places of employment, but which is frequently closely related to generalized atmospheric pollution.

279

Hama, G., 1954
W. Fredrick, D. Millage, and H. Brown.
ABSOLUTE CONTROL OF CHROMIC ACID MIST; INVESTIGATION OF A NEW SURFACE-ACTIVE AGENT. Amer. Indus. Hyg. Assoc. Quart., v. 15, Sept. 1954: 211-216, illus. DLC

A study was made of the effectiveness of a new fluorinated surface-active agent, "Zeromist", in controlling chromic acid mists in commercial plating operations. It greatly reduced the air pollution of the work room, and the amount of pollutants emitted from the discharge stack into the atmosphere.

280

Hansen, T. 1955
[CLEANING OF WASTE GASES BY FILTERING]
Reinigung von Abgasen durch Filter. Zeitschr. Erzbergbau und Metallhüttenwesen, v. 8, Mar. 1955: 104-106. DBS

The qualities of cotton, wool, glass fiber, and several synthetic materials used in filters for the purification of gases are discussed. Synthetic fabrics such as Redon, Pan, Orlon, and Terylene withstand temperatures of 140°C and higher, while cotton and wool fibers withstand temperatures to about 100°C. The properties of various fibers and fabrics used in the metallurgical, mining, and chemical industries are compared in tables.

281

Hanst, P. L., 1956
E. R. Stephens, and W. E. Scott.
REACTIONS INVOLVING OZONE, NITROGEN DIOXIDE, AND ORGANIC COMPOUNDS AT LOW CONCENTRATIONS IN AIR. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 219-225, 244, illus., tables. DLC

Ozone is probably the oxidizing agent in smog. Experiments were performed by the Franklin Inst., Philadelphia, Pa., which describe how ozone is formed, and what part ozone plays in producing the objectionable features of smog. The following reactions are described: (1) ozone-olefin; (2) nitrogen dioxide-olefin; (3) ozone-saturated hydrocarbons; (4) nitrogen dioxide-saturated hydrocarbons; (5) ozone-aldehyde; (6) nitrogen dioxide-aldehyde; (7) peroxy acid-nitrogen dioxide; and (8) biacetyl-aldehyde-air. A summary is given, and conclusions are drawn.

282

Harris, W. B., 1953
H. D. Levine, and M. Eisenbud.
FIELD EQUIPMENT FOR THE COLLECTION AND EVALUATION OF TOXIC AND RADIOACTIVE CONTAMINANTS. Arch. Indus. Hyg. and Occupat. Med., v. 7, June 1953: 490-502, illus.
DLC (RC963. A14, v. 7)

Mechanical filtration is considered to be the "most satisfactory means of sampling air containing microgram quantities of dust and of dry impingement for particle size determination." It allows for the collection of particles in all size ranges for gravimetric, radiometric, or chemical analyses. The disadvantages of other systems, e.g., the wet "impinger," the electrostatic precipitator, and the thermal precipitator, are listed. The following units make up the portable low volume sampling and measuring equipment which are used to obtain minute concentrations of airborne contamination: (1) 6-lb sampling pump (modified from a commercial paint sprayer); (2) 6-volt sampler (power unit); (3) filter holder (4 oz.); (4) filter paper (Whatman no. 41); and (5) cascade impactor (for particle size determination). Also briefly described are a high-volume (20 cu ft/min) air sampler and a radon sampler. In an appendix, a muffler is described which attenuates the high frequency "whine" of the air pump without reducing the air flow through the filter paper in low-volume sampling.

283

Harris, W. B., 1953
and M. Eisenbud.
DUST SAMPLER WHICH SIMULATES UPPER AND LOWER LUNG DEPOSITION. Arch. Indus. Hyg. and Occupat. Med., v. 8, Nov. 1953: 446-452, illus. DLC (RC963. A14, v. 8)

A dust sampler, the Aerotech Tube Design 2, was constructed using a single unit from an industrial cyclone dust collector. The device collects particulate airborne matter in 2 size ranges. The fraction containing the larger particles simulates the particle-size spectrum of that portion of the material which would be expected to be retained by the upper part of the respiratory tract, and the fraction containing the smaller particles simulates that retained by the lower part of the tract. Curves are given showing the respiratory rentention of particles up to 6 microns in diameter. The performance curve of the Aerotech Tube Design 2 is also presented for dusts (sp gr 2.6) at a flow of 40 cu ft/min.

284

Hart, W. B. 1954
ATLANTIC AIR POLLUTION CONTROL PROGRAM. Air Repair, v. 4, Nov. 1954: 124, 169-170. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The progress made at the Atlantic Refining Co. at Philadelphia, Pa. in reducing atmospheric pollution, particularly from sulfur dioxide fumes, is described. The company uses a 2-stage vacuum-type concentrator for sulfuric acid which makes no sulfur dioxide fumes, and operates at a relatively low temperature, and a sludge conversion unit for sulfuric acid production which eliminates odors from the boiler stack house. A mobile laboratory collects and analyzes samples. Any emission of smoke from the plant is observed by a "smoke detective," who immediately reports the infraction to the head of the department operating the offending unit for correction. The "smoke detective" is governed by a "Philadelphia ordinance [which] permits a minor discharge of smoke for a few min (Ringelmann Chart no. 3 for 2 min in any 15 min, but not more than 3 times in any 24 hr)."

285

Hartz, N. W. 1953
INSTRUMENTS THAT CITIES CAN USE TO MEASURE AIR POLLUTION. Amer. City, v. 68, Apr. 1953: 112-113.
DLC (HT101. A5, v. 68)

Since evidence indicates that long exposure to contaminated air may have physiological effects, it is necessary to develop further means to study air pollution. Instruments for air pollution studies may be classified as those used to: (1) spot-test the atmosphere for general surveys; (2) continuously analyze the atmosphere for particular contaminates which are causing extensive problems; (3) spot-test stack effluents to identify the presence and amount of contamination; (4) continuously monitor stack effluents for contamination; and (5) study pollution under particular meteorological conditions. Various instruments are given for use in each of these classifications.

286

Hatch, T. 1955
DEVELOPMENTS IN THE SAMPLING OF AIRBORNE DUST. Arch. Indus. Health, v. 11, Mar. 1955: 212-217. DLC (RC963.A14, v. 11)

The penetration and retention of dust particles according to size in the various levels of the respiratory system are discussed. With this in mind, it is stated that dust collecting instruments should, in general, separate the particles of larger size (above 5 microns) which would be expected to be trapped in the upper portion of the respiratory tract from those smaller particles which would be expected to penetrate to the alveoli. The efficiency of the konimeter and the thermal precipitator in collecting particles of various sizes and states is mentioned. In addition, it is noted that there is need for further correlation of dust concentration with hazards.

287

Hawkins, J. E., 1955
and G. Nonhebel.
CHIMNEYS AND THE DISPERSAL OF SMOKE. Jour. Inst. Fuel, v. 28, Nov. 1955: 530-545, illus. DLC (TP315.I6, v. 28)

It is necessary to choose minimum heights of chimney and exit velocities of flue gases which are related to the height of surrounding buildings, diameter of chimney, and local ground contours to avoid parts of a smoke plume being blown rapidly to the ground by local disturbances of the wind. Even when the smoke avoids these disturbances, part of it, considerably diluted, reaches the ground at distances beyond about 6 times the effective height of the chimney. This effective height is the sum of the actual height and a function of the temperature, volume, and velocity of the gases at the mouth of the chimney. Theoretical formulas, developed for the calculation of smoke concentration at ground level at any distance from a chimney and the rate of dust and grit deposition, are discussed and presented in a form suitable for use by design engineers, together with the supporting evidence from direct measurements. The agreement is sufficiently good for most design purposes. The meteorological background of the problem is described in an appendix. (Authors' abstract)

288

Hayes, S. C., 1955
N. M. McGrane, and D. B. Perlis.
VISUAL CLARITY IN KILN DISCHARGE GASES. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 171-172, 186, illus. (Paper presented at the 48th Annual Meeting of the Air Pollution Control Association at Detroit, Mich., May 22-26, 1955) DLC

Wet-collection systems of various designs were tried without success in attempts to eliminate dust from kiln discharge gases at the Heatherington and Ferner plant of the Cadillac Asphalt Paving Co. of Detroit, Mich. Satisfactory control of the dusts was achieved by the use of a Dualaire dust collector which separates the dust from a gas stream by filtering the gas through dense wool felt. The porosity of the fabric is maintained by means of a high-velocity jet of clean air applied to the clean side of the felt. The dustladen gas is introduced at the top of the cylinder that forms the filter element, and that portion of the gas that flows down to pass through the lower portions of the element aids in carrying the collected dust to the hopper. The system is completely automatic, for when the action of the reverse jet restores the porosity of the felt, the pressure drop decreases, and when it reaches a preset lower value, the cleaning system is automatically shut off; likewise, when the pressure drop across the collector reaches a preset level the cleaning-air blower is automatically turned on.

289

Hebley, H. F. 1956
THE CONTROL OF GOB PILE FIRES. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 29-31, 51. DLC

In the last 15 years, there has been a growing insistence that greater effort be made to dispose of trade wastes in a manner that will alleviate the pollution problem experienced in rivers and skies of industrial areas. The problem of the coal industry was the control of "gob" pile fires. These refuse piles contain the discarded coal that is allowed to burn, thereby polluting the atmosphere; the combustible material in the refuse is comprised of coal in various forms--- sand, shale, clay, gypsum, particles of iron carbonate and iron sulfide (pyrite), and other impurities. Prevention of combustion in gob piles by spreading the refuse in a layer and covering with clay or sludge is discussed.

290

Hein, L. B., 1955
A. B. Phillips, and R. D. Young.
RECOVERY OF SULFUR DIOXIDE FROM COAL COMBUSTION STACK GASES. Chapter 15. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 155-169. DLC (TD883.I5, 1955)

This report discusses data obtained in pilot plant studies of the recovery of sulfur dioxide, in usable form, from coal combustion gases. The sulfur dioxide was absorbed in ammonia solution. The major variables studied were recirculation rate, pH, and concentration of the scrubbing liquor and the depth of packing and gas velocity in the scrubber. These studies were made at the laboratories at Wilson Dam, Alabama as a part of work conducted by TVA "to evaluate the emissions of sulfur dioxide from steam plants so as to identify any needed controls."

291

Heller, W. 1955
THE DETERMINATION OF PARTICLE SIZE AND REFRACTIVE INDEX NEAR THE TURBIDITY MAXIMUM IN MONODISPERSE SUSPENSIONS OF SPHERICAL PARTICLES. Jour. Chem. Phys., v. 23, Feb. 1955: 342-343.
DLC (QD1.J94, v. 23)

Theoretical values on the specific turbidity of colloidal spheres within the range of diameters of 1 to 2 microns are given. It is shown how an unambiguous particle size can be determined within this range in spite of a turbidity maximum. The latter can be determined for almost any refractive index by means of an empirical equation. An alternate turbidity maximum can be used for determining the refractive index of the light scattering material provided the diameter is known. (Author's abstract)

292

Helsby, F. W., 1955
and D. C. P. Birt.
FOAM AS A MEDIUM FOR GAS ABSORPTION. Jour. Appl. Chem., v. 5, July 1955: 347-352. DA

A method of removing the soluble part of a gas mixture by foam is described. The foam bed is formed by passing the mixture through a porous plate over which a suitable absorbent liquid is caused to flow. The process is illustrated by some results from experiments designed to remove carbon dioxide from the air. It is shown that high coefficients of absorption are obtained, and that for the conditions specified the method is superior to the conventional packed tower.

293

Hemeon, W. C. L. 1953
SCIENTIFIC BOUNDARIES IN AIR POLLUTION STUDIES. Amer. Indus. Hyg. Assoc. Quart., v. 14, Mar. 1953: 35-40, illus. DLC

It is believed that the water-soluble fraction of airborne solids cause irritation when they are dissolved in the aqueous fluids bathing the mucous membranes of the respiratory system. With this in mind, a fraction of air-suspended material collected over the city of Pittsburgh, Pa. was studied. It was found that 10% to 15% of the solids were soluble in water. The fraction consisted of 40% to 50% sulfates (expressed as SO_3), 5% to 7% chlorides, with liberal amounts of ammonia, calcium, sodium, potassium, magnesium, and many other metals in lesser quantities. Some of the other aspects of the air-pollution problem discussed were: measurement of atmospheric concentrations; heterogeneous character of suspended solids; variability in composition; sensory discomfort; odor; psychological aspects; human opinion; and relative scales of intensity of air pollution.

294

Hemeon, W. C. L., 1953
J. D. Sensenbaugh, and G. F. Haines, Jr.
MEASUREMENT OF AIR POLLUTION. Instruments, v. 26, Apr. 1953: 566-568, 590, 592, 594, illus. DLC (TA165.A2, v. 26)

Air pollution is measured both at the stack, and the location where its effect is produced. Air pollutants are classified as gaseous or solid, the commonest of each being sulfur dioxide and coal smoke, respectively. Solid air pollutants are more difficult to analyze than gaseous pollutants, primarily because no one instrument applies to both fine and coarse particles. Basic techniques are described and illustrated for both types of pollutants.

295

Hemeon, W. C. L., 1954
and G. F. Haines, Jr.
THE MAGNITUDE OF ERRORS IN STACK DUST SAMPLING. Air Repair, v. 4, Nov. 1954: 159-164. (Paper presented at the Semiannual Meeting of the American Society of Mechanical Engineers, Pittsburgh, Pa., June 22, 1954) DLC

The results of studies on the magnitude of errors inherent in procedures for gas sampling where the sampling rate amounts to 0.5 to 2 cu ft/min are presented. Sampling equipment with a filter outside the duct or stack and a sampling tube connecting it to the nozzle introduces errors caused by dust deposits in the tube, and by corrosion of the interior of the tube by sulfurous gases and moisture condensation. Designs for integral filters are discussed, and results of investigations on the errors caused by departures from isokinetic sampling conditions are presented. For coarse particles, the error is less when results are calculated on the basis of approach velocity; in sampling finer particles, impaction calculation and approach velocity calculations give about the same error. In the measurement of dust which is a mixture of fine and coarse particles, such as that resulting from combustion of solid fuels, calculations based on nozzle velocity would be superior.

296

Hemeon, W. C. L. 1955
THE ESTIMATION OF HEALTH HAZARDS FROM AIR POLLUTION. Arch. Indus. Health, v. 11, May 1955: 397-402.
DLC (RC963.A14, v. 11)

Well-documented evidence now exists on the effects to health of acute air pollution, but there is little objective evidence bearing on the health hazards of chronic exposure. Irritation of the respiratory tract, and not systemic poisoning, appears to be the result of acute exposures. Evidently the irritant is particulate, either liquid or solid, rather than gaseous. It is believed that only the water-soluble fraction in smogs is responsible. Analyses of solid material obtained from an air filter during the London smog of 1952, and of air samplings taken during the Donora, Pa. smog of 1948, indicate strongly that the irritant substances may be acidic salts, particularly metal ammonium sulfates.

297

Hershberger, W. D. 1955
PRELIMINARY EVALUATION OF THE MICROWAVE METHOD FOR STUDYING THE COMPOSITION AND FORMATION OF SMOG. (Abstract). Analyt. Chem., v. 27, June 1955: 1034. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955)
DLC (TP1.I615, v. 27)

The program and the instrumentation under development for studying smog employing the microwave method are described. Smog samples are being collected by cooperating laboratories for analysis in the microwave spectroscope while samples of nitrogen dioxide in various mixtures are studied, using the paramagnetic resonance method. One advantage of the microwave method is its high resolution, which permits the identification of one particular component in a gaseous mixture; one disadvantage is that the method is limited to the study of gases which display an electric or a magnetic moment. The detection of free radicals by the microwave method has been reported, and equipment is being developed for studying the spectra of gases of interest illuminated by ultraviolet light for the detection of radicals or excited states of molecules. Equipment is being constructed for free space propagation over a fixed path of 36,000 mc in the Los Angeles Basin to determine whether the large scale effects of smog on microwave propagation are comparable with those for water vapor at 24,000 mc used in weather tracking. (Author's abstract)

298

Hessemer, R. A., Jr. 1954
EFFECTS OF SMOKES ON ATMOSPHERIC IONIZATION. Jour. Franklin Inst., v. 258, July 1954: 31-41.
DLC (T1.F8, v. 258)

It is known that hot wires emit positive and negative ions, but the variables surrounding this action are many and not completely understood. Positive ions originate from impurities in the metal itself, while negative ions are formed from the capture of the emitted electrons by surrounding molecules. The equipment in these studies consisted of a hot filament positioned between upper and lower collecting plates, across which a variable direct voltage flows. From a duct, the smoke passes between the plates and through a photoelectric measuring unit. Three tests were conducted: (1) the first 2 tests showed that ion currents from hot filaments are relatively stable after about 100 min operation; and (2) the third test provided an observation of ion currents in the presence of smokes. It appears that the effects of smoke on ion current changes are attributed to the gases in the smoke rather than to the particulate matter.

299

Hewson, E. W. 1955
STACK HEIGHTS REQUIRED TO MINIMIZE GROUND CONCENTRATIONS. Trans. Amer. Soc. Mech. Engineers, v. 77, Oct. 1955: 1163-1172. (Paper no. 54-A-211 presented at Annual Meeting of the American Society of Mechanical Engineers, New York, N. Y., Nov. 28-Dec. 3, 1954) DA

Aerodynamic and meteorological concepts are combined in a procedure for estimating ground concentrations of effluents from stacks having various heights and exit-gas velocities. The operation of each of the several influences at work is first defined. A detailed example is then given of how the most important phases were integrated into a consistent procedure for predicting ground concentrations in answer to a specific design problem. Further improvements and refinements of the method are desirable, and are being incorporated in a later study.

300

Hewson, E. W. 1956
METEOROLOGICAL FACTORS AFFECTING CAUSES AND CONTROLS OF AIR POLLUTION. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 235-241, illus. (Paper presented at a meeting of the Industrial Research Institute, Houston, Texas, Oct. 25, 1955) DLC

A number of atmospheric processes which lead to dispersion of pollution wastes by the atmosphere are discussed. These include transport by winds, turbulent diffusion, and the inversion breakup process. Natural cleansing of the atmosphere is aided by any or all of the following: fallout, rainout, and washout. In addition to aiding in plant location, meteorology contributes to pollution control programs by providing information on the shape and and orientation of buildings; stack height; output of contaminants; and emergency precautions. A suggested meteorology program, which is appropriate for the analysis of pollution from a single source, i.e., an industrial plant, is suggested; it includes recording of wind direction and speed, atmospheric turbulence, and lapse rate measurements.

301

1956
HIGH OFFICIALS FOR AIR POLLUTION. Chem. and Eng. News, v. 34, June 18, 1956: 2994.
DLC (TP1.C35, v. 34)

It is suggested that the responsibility for air pollution abatement be placed in the hands of high company officials. Because of antipollution legislation, industry has responded by establishing some effective company organizations for air pollution abatement. However, more action together with a well-organized educational program for effective control is needed, since "air pollution control needs the same level of management as processing, production, and development."

302

Hill, W. H., 1953
and T. Hatch.
NEPHELOMETRIC DETERMINATION OF NITRITE SOLUTIONS. Amer. Indus. Hyg. Assoc. Quart., v. 14, June 1953: 98-102. DLC

A method is described for the determination of nitrogen dioxide. Sulfamic acid and nitrous acid react to give sulfuric acid, nitrogen, and water. Previous tests depending on the volumetric determination of nitrogen were not very satisfactory for low concentrations (20-200 ppm) of nitrogen dioxide, and often gave too high results since sulfamic acid and sulfamates hydrolyze appreciably at elevated temperatures with the formation of sulfates. The method described is based on the amount of sulfuric acid formed in the reaction by precipitating it at room temperature with barium sulfate and measuring the precipitate nephelometrically. A Fisher Nefluoro photometer was used as the nephelometer. Turbid polystyrene bars with particles of silicon dioxide suspended in them were used in place of the usual liquid suspensions for the standard and "generator" suspensions. A variation of the method for low concentrations (i.e., less than 25 ppm) of NO_2 in air is given.

303

Hilst, G. R., 1955
and H. Moses.
THE ARGONNE EXPERIMENTAL METEOROLOGY STACK. Bull. Amer. Meteorol. Soc., v. 36, Jan. 1955: 31-32, illus.
DLC (QC851.A6, v. 36)

In order to meet, at least in part, the need for more comprehensive observations of the behavior of stack effluents, an experimental meteorology stack has been designed and built at the Argonne National Laboratory, Lemont, Ill. The primary design requirements established for this installation were: variable stack height, variable effluent exit speeds, controllable effluent tracer concentrations, and portability of the stack assembly. For reasons of economy, no facility for controlling the effluent temperature was incorporated in the present stack design; this is to be added. Some further information on the design and operation of the stack, including a photograph and an architectural sketch, are given. (Authors' abstract in part)

304

Himsworth, F. R. 1954
PROTECTION OF STEEL WORK FROM ATMOSPHERIC CORROSION. Iron and Coal Trades Rev., v. 168, Feb. 19, 1954: 461-464.
DLC (TN1.I7, v. 168)

The traditional method for protecting steel from atmospheric corrosion includes weathering, descaling, priming, and painting. The first step has been omitted, but rust and scales can be removed by shot-blasting, acid-pickling, or phosphating, which is accomplished by immersion in hot phosphoric acid after descaling in an acid bath. Two primers suggested are red lead or a zinc-rich primer consisting of zinc powder and chlorinated rubber or polystyrene. The type of paint selected and the frequency of maintenance depend on the amount of atmospheric contamination. A new method of protecting steel is metal-spraying in which a thin film of zinc or aluminum is deposited on the steel. The economics of the initial coating and the maintenance are discussed.

305

Hirst, J. M. 1952
AUTOMATIC VOLUMETRIC SPORE TRAP. Ann. Appl. Biol., v. 39, June 1952: 257-265, illus.
DNLM

A vacuum-pump-activated suction trap is discussed, and illustrated, in which spores in the air enter a narrow orifice, directed into the wind, and are impacted on a vaseline-coated microscope slide moving across the orifice at a rate of 2 mm/hr. Estimations of spore (or particle) content of the air can be made with higher efficiency than by previous traps at different times of day; this allows for closer correlation with variations in weather. The trap can be maintained, and the slide changed daily, after removal of the clock mechanism (which moves the slide) cover and orifice cylinder. Calibration and testing of the equipment have been carried out in a wind tunnel using spores of Lycopodium clavatum. The tests indicated that the impaction of the spores, or of pollens, rust or mildew spores, should be complete at suction rates of either 10.0 or 17.5 l/min.

306

Holden, F. R., 1954
F. W. Dresch, and R. D. Cadle.
STATISTICAL CONTROL OF FLUORESCENT PARTICLE TRACER STUDIES. Arch. Indus. Hyg. and Occupat. Med., v. 9, Apr. 1954: 291-296.
DLC (RC963.A14, v. 9)

Fluorescent particles (commonly 1 to 5 microns in diameter) of zinc cadmium sulfide can be dispersed from the stacks of an industrial plant to provide a means of tracing the movement of industrial air pollutants. Statistical methods for counting particles which are collected on millipore filters, are described together with methods employed for training personnel to make the counts.

307

Hollingsworth, R. L. 1955
and B. F. Waling.
DETERMINATION OF ETHYLENE OXIDE IN AIR; EXPERIENCE IN THE USE OF LUBATTI'S METHOD. Amer. Indus. Hyg. Assoc. Quart., v. 16, Mar. 1955: 52-54, illus. DLC

Lubatti's method for determination of ethylene oxide (Jour. Soc. Chem. Indus. (Trans.), v. 63, May 1944: 133-139) in prolonged, repeated vapor inhalation experiments, was found to yield results quite comparable to those of the calculated concentrations. This method of analysis for ethylene oxide is nonspecific in the presence of alkaline or acid gases which changes the acidity of the sulfuric acid-magnesium bromide reagent which is used. The necessity to use a suitable control blank for checking this situation, may limit the usefulness of the method in industrial hygiene work. Procedures are described, also, for obtaining a known vapor concentration of any gaseous material.

308

Holt, P. F. 1952
ASPECTS OF THE SILICOSIS PROBLEM. Nature, v. 169, Feb. 23, 1952: 306-307.
DLC (Q1.N2, v. 169)

Some theories and speculations in the literature on the pathogenesis of lung tissue damage by silicosis are reviewed and discussed. It is propounded: that tissue damage in silicosis is due to the abrasive action of silica dust or to the spiked shape of the particles; that quartz slowly dissolves in tissue fluids to produce a toxic silicic acid; and that minerals which cause silicosis dissolve more readily and give higher concentrations of silicic acid. Of a number of dusts collected from a variety of industrial atmospheres, all were strongly alkaline according to the findings of one worker in the field.

309

Holt, P. F., 1953
and A. J. Chalk.
NEW METHOD FOR MONITORING AIRBORNE DUST. Arch. Indus. Hyg. and Occupat. Med., v. 7, May 1953: 404-410, illus.
DLC (RC963.A14, v. 7)

A nephelometric method for assay of dust concentrations is described in detail. The technique is relatively rapid and easy, requiring no highly skilled personnel; it is applicable to a wide range of atmospheric dust concentrations since the sample for assay can be adjusted to any desired value. Because of its variation to different kinds of dust, calibration of the instrument must be carried out on known samplings of dust of the same composition. This feature offers an advantage since it may be possible to suppress one component of a mixed dust.

310

Holt, P. F., 1953
and S. G. Osborne.
STUDIES ON THE NATURE OF SILICOSIS: THE EFFECT OF SILICIC ACID ON CONNECTIVE TISSUE. Brit. Jour. Indus. Med., v. 10, July 1953: 152-156, illus. DLC (RC963.A23, v. 10)

Silicic acid is capable of reducing the permeability of membranes treated with hyaluronidase. Its function in fibrogenesis is considered to be analogous to that of the mucopolysaccharides. By considering that the formation of fibrotic tissue requires (1) the dissolution of dust in the tissue fluid, and (2) the polymerization of the silicic acid formed, an explanation is given of the pathogenic effects of free silica dust, and the harmless nature of cement dust. (Authors' abstract)

311

Holton, W. C., 1953
and E. J. Schulz.
SOME NOTES ON DUST-SAMPLING EQUIPMENT AND TECHNIQUE. Trans. Amer. Soc. Mech. Engineers, v. 75, Oct. 1953: 1327-1331.
DLC (TJ1.A7, v. 75)

Dust-sampling equipment for measuring the concentration of dust in a gas stream is diagrammed and discussed. Samples should be taken at a number of points along the gas stream under constant flow conditions. Sampling time depends on the equipment and the operator, but is usually about 10 min. The pitot tube, carrying the gas sample to the dust-separating section, and the venturi, a gas-metering device, are calibrated before sampling. The dust collected and the gas sampled are weighed, and the concentration is the quotient of the 2. Tabular data for 4 different samplings show the good reproducibility that can be attained.

312

Holton, W. C., 1954
and D. F. Reynolds, Jr.
A COMPARISON OF SIZE-CONSIST DETERMINATION OF DUPLICATE SAMPLES OF FLY ASH. Combustion, v. 26, Aug. 1954: 41-46.
DLC (TJ1.C8, v. 26)

In order to understand the problems involved in the design of dust collectors, a study of particle sizes in fly ash was initiated. Some of the methods applicable to such a study are: (1) sedimentation of particles in a liquid with the results expressed as percentages in a particular size range; (2) air-elutriation devices such as the Roller Analyzer and the Infrasizer; (3) a centrifugal classifier combining a centrifuge and an air elutriator in its operation; and (4) microscopic counts by which samples are measured by a cross-hair and venier attached to a microscope slide. Measurements, made by 4 separate companies using a pulverized coal fly ash, are tabulated and agree within 10%.

313

Hosey, A. D., 1953
and H. H. Jones.
PORTABLE ELECTROSTATIC PRECIPITATOR OPERATING FROM 110 VOLTS A. C. OR 6 VOLTS D. C. Arch. Indus. Hyg. and Occupat. Med., v. 7, Jan. 1953: 49-57, illus.
DLC (RC963.A14, v. 7)

This experimental-model, light-weight portable electrostatic precipitator collects air samples directly on glass slides or metal plates, and has a sampling head with built-in flowmeter.

314

Houdry, E. J. 1954
WORLD'S BIGGEST CLEANING JOB. Jour. Franklin Inst., v. 258, Sept. 1954: 175-185.
DLC (T1.F8, v. 258)

The Oxycat, a commercial oxidation catalyst, is made up of 2 porcelain end plates connected by 71 porcelain rods coated with a catalyst composed of platinum and aluminum. The catalytic action is initiated at 500°F, and thereafter produces an exothermic reaction. Several uses of the Oxycat are discussed and illustrated: (1) in connection with a Venturi admitting necessary air, it has been used with gasoline engines, particularly gas trucks for the combustion of exhaust gases to carbon dioxide and water; (2) a similar design has been applied to automobiles to eliminate over 80% of the hydrocarbons and 90% of the carbon monoxide in the exhaust; (3) 80% of the obnoxious fumes and odors can be removed from the exhaust of diesel equipment; (4) with a number of units stacked in the chimney, fumes and odors from industrial processes are eliminated, and the heat generated in the catalytic reaction can be returned for use in plant processes; (5) a smaller adaptation of the Oxycat removes odors present in homes; and (6) installing the Oxycat in a secondary chamber at the exhaust of a domestic incinerator, removes smoke and odors from that source.

315

Houghton, H. G. 1955
ON THE CHEMICAL COMPOSITION OF FOG AND CLOUD WATER. Jour. Meteorol., v. 12, Aug. 1955: 355-357. DLC (QC851.A283, v. 12)

The partial chemical analysis of some 90 samples of fog and cloud water is reported. The fog samples were collected at 4 locations along the northeast coast of North America, and the cloud samples were obtained on Mount Washington, New Hampshire. It is found that the soluble nuclei are predominantly chlorides and sulfates. The chlorides are dominant in air with a recent trajectory over the sea, while the sulfates are always present. In many cases it appears that much of the sulfate is in the form of sulfuric acid. (Author's abstract)

316

Hounam, R. F. 1952
SOME COLLOIDAL PROPERTIES OF INERT DUSTS. Arch. Indus. Hyg. and Occupat. Med., v. 5, Apr. 1952: 375-386, illus.
DLC (RC963.A14, v. 5)

In connection with the solubility theory of silica, whereby silica causes silicosis, the dye-adsorption and sedimentation properties of suspensions of various dusts were studied. It was found that, in general, the dusts which give rise to silicosis and pneumoconiosis form negatively charged hydrophobic sols when suspended in water or in a 50% solution of ethyl alcohol and water, the charge being greater with increased toxicity. Dusts which are nontoxic may carry a very small negative charge, but become positively charged when similarly suspended. Addition of aluminum powder, to form a positively charged sol of colloidal alumina, modified the toxic action of silica which normally acquires a negative charge on suspension in water. There is probably a close correlation between the solubility and the stability of silica suspensions. (Author's abstract in part)

317

Hounam, R. F. 1954
SOME REACTIONS BETWEEN INERT DUSTS AND PROTEINS. Arch. Indus. Hyg. and Occupat. Med., v. 9, Apr. 1954: 284-290.
DLC (RC963.A14, v. 9)

Experiments indicated that certain dusts in suspension, both negatively and positively charged, were coagulated by appropriate proteins. These direct reactions between dusts and the proteins of tissue fluids may be a link in the chain connecting the inhalation of dust with the onset of pneumoconiosis.

318

Howe, W. A. 1956
DIESEL SMOKING. S.A.E. Jour., v. 64, Apr. 1956: 33. DLC (TL1.S5, v. 64)

A discussion is given on different diesel engines and fuels, and the smoke discharged under varied fuel conditions. On the whole, smoke intensity is directly proportional to the end point of the fuel, and inversely proportional to the cetane number. Amyl nitrate raises the cetane number causing less smoke at high speeds. The air-fuel ratio reduces the smoking tendencies when the exhaust gases are diluted.

319

Huber, R. E., 1954
and others.
NEW ENVIRONMENTAL RESPIRATORY DISEASE (YOKOHAMA ASTHMA). PRELIMINARY REPORT. Arch. Indus. Hyg. and Occupat. Med., v. 10, Nov. 1954: 399-408.
DLC (RC963.A14, v. 10)

Clinical features are presented of a new environmental respiratory disease occurring in certain areas of Japan during the winter months among United States military personnel. From preliminary atmospheric data, there appears to be a correlation between the incidence of this environmental respiratory disease entity, the concentration of air contaminants, and smog formations. Of the air contaminants investigated, only the ether-soluble aerosols and dust appear to have significant correlation with the incidence of this respiratory entity. Additional investigations will be required to corroborate the above suggested correlations. (Authors' abstract)

320

Hudson, J. C., 1953
and J. F. Stanners.
THE EFFECT OF CLIMATE AND ATMOSPHERIC POLLUTION ON CORROSION. Jour. Appl. Chem., v. 3, Feb. 1953: 86-96, illus.
DLC (TP1.S612, v. 3)

The results of observations on the corrosion of reference specimens of ingot iron and of zinc exposed at the atmospheric testing stations of the Corrosion Committee all over the world are presented and discussed. The data, which relate to more than 20 sites (up to 20 separate tests/yr at each), provide a good indication of the effect of climatic differences on atmospheric corrosion. In Great Britain, where for most of the yr the climate is sufficiently humid to promote corrosion, the determining factor for its severity is the sulfur pollution of the air. Tests made in collaboration with the Fuel Research Station at 16 sites where atmospheric pollution is measured have shown an almost perfect correlation between the amount of sulfur dioxide taken from the atmosphere by lead peroxide pollution gauges and the rate of corrosion. In the absence of sulfur pollution, corrosion at the sites overseas is generally slight; in dry climates, it is negligible. Preliminary tests on specimens exposed at different heights on the Sutton Coldfield television mast suggest that the effect of altitude is secondary to the natural variations in rates of corrosion. (Authors' abstract in part)

321

Hueper, W. C. 1954
ENVIRONMENTAL LUNG CANCER. Indus. Med. and Surg., v. 23, Oct. 1954: 463-467.
DLC (RC963.A37, v. 23)

The following conclusions are drawn: "(1) The total epidemiologic, clinical, pathologic and experimental evidence on hand clearly indicates that not a single but several, if not numerous, atmospheric pollutants are responsible for the causation of lung cancer. (2) The available data do not permit any definite statements as to the relative importance of the various recognized respiratory carcinogens in the production of cancers in the general population. Additive, cumulative and synergistic effects of several such agents are a distinct possibility. (3) Observations on occupational respiratory cancers, on the other hand, indicate that in restricted occupational groups exposed to well-defined and highly potent respiratory carcinogens all or most of the respiratory cancers found are attributable to one single carcinogenic air pollutant. (4) The widespread presence of industry-related atmospheric pollutants of recognized carcinogenic properties suggests that the recent alarming rise in lung cancer frequency, especially among males, is causally related to the local and general development of modern industry, and the use of its products. (5) While it is possible that cigarette smoking has played a contributory role in this respect, the total evidence available, if critically evaluated, does not favor the concept that cigarette smoking represents a major factor. (6) Since extensive efforts are required for obtaining an effective preventive control of the existing respiratory cancer hazards, rigid measures should be taken to discourage the introduction of new atmospheric air pollutants of carcinogenic type, especially if they are of the general environmental variety which are most difficult to control." (Quoted in part)

322

Hueper, W. C. 1954
RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER. [I]. Arch. Pathol., v. 58, Oct. 1954: 360-399.
DAFM

A report is made on the relationship between the environment and cancer. The material presented includes a discussion of the following topics: (1) occupational cancers 25 years ago; (2) recent developments in occupational and environmental cancers; (3) cancers as environmental diseases; and (4) environmental cancers and carcinogens (inorganic chemicals). Data are presented demonstrating trends, localization of cancers in body parts, relationship between concentration of industrial plants and cancer, and the effect of racial, age, and sex differences. Mention is made of the role of air pollutants, e.g., smoke, exhaust fumes, arsenicals, and radioactive materials as carcinogenic agents.

323

Hueper, W. C. 1954
RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER. [II]. Arch. Pathol., v. 58, Nov. 1954: 475-523.
DAFM

This paper includes material relating the following to cancer: organic chemicals, physical agents, infectious agents, tobacco extractives, and some dietary factors. Of particular interest, because of its relation to air pollution, is the section on organic chemicals. A report on the effect of benzene, aromatic compounds, and petroleum derivatives is presented.

324

Hueper, W. C. 1954
RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER. [III]. Arch. Pathol., v. 58, Dec. 1954: 645-682.
DAFM

This paper refers to the following as carcinogenic agents: dietary factors, mustards, and tobacco smoke. Particular attention is given to the controversial results regarding the effect of tobacco tars and smoking on lung cancers. Mention is made of the need for control of dusts, arsenicals, and combustion products in an effort to control cancer.

325

Hueper, W. C. 1955
MEDICOLEGAL ASPECTS OF CANCER. Amer. Jour. Clin. Pathol., v. 25, Feb. 1955: 116-125.
DLC (RB1.A3, v. 25)

In a section on "Environmental Pollutants and Cancer" (p. 122-124), the possibility is discussed that the numerous nonspecific and specific pollutants of the atmospheric air, water, soil, and foodstuffs, may become a matter of medicolegal consideration concerning the liability for cancers developing among members of the general population living in an environment contaminated with these materials, especially in persons residing in urban and highly industrialized areas. The possible existence of causal relations between environmental pollutants, and the occurrence of cancers among persons thus exposed has during recent years been a matter of serious debate in connection with the alarming increase in cancers of the lung. (Author's abstract in part)

326

Hull, H. M., 1954
F. W. Went, and N. Yamada.
FLUCTUATIONS IN SENSITIVITY OF THE AVENA TEST DUE TO AIR POLLUTANTS. Plant Physiol., v. 29, Mar. 1954: 182-187.
DA

The Avena test -- a biological assay using Avena seedlings to measure minute quantities of the plant growth hormone, auxin -- has been known to show periods of daily and seasonal fluctuations in sensitivity in the tests made in the Pasadena, Calif. area. Usually the greatest sensitivity occurred in the early morning hr, with lesser sensitivity later in the day. Various reasons for this change in sensitivity have been ascribed, including the effect of air pollutants. In experimental studies using a synthetic smog, the Avena seedlings' response to applied auxin was considerably repressed especially when the fumigation occurred on the first or second day of germination as compared with the third or final day of growth. When Avena tests were carried out every 3 hr over a 24-hr period simultaneously in filtered or unfiltered, contaminated air, the diurnal fluctuation which occurred in plants grown in unfiltered air was absent in those grown in filtered air; thus, it was indicated that the variability in sensitivity was a result of fluctuating concentrations of air pollutants. A test carried out in similar manner during a smog-free period indicated an absence of diurnal fluctuation even in the case of plants grown in unfiltered air. It is suggested that the cause of decreased response to applied auxin lies not in the destructive effect of peroxides and other pollutants on the test materials, but rather in an effect on the growth response of the coleoptile itself.

327

Humphrey, A. E., 1955
and E. L. Gaden, Jr.
AIR STERILIZATION BY FIBROUS MEDIA. Indus. and Eng. Chem., v. 47, May 1955: 924-930.
DLC (TP1.I6, v. 47)

A discussion is presented of the mechanics of fibrous filters in removing particles (microorganisms) from air streams. Air filters must be constructed for high removal efficiency and low pressure drop. Various filters designed to remove particles as small as 0.5 micron in diameter with high efficiency were studied. Mathematical expressions for the penetration of filter beds are given. The experimental apparatus is diagrammed, and the method used for the test is discussed. A graphical comparison of 3 industrial mats, a starch filter (IMS), a furfural filter (IMF), and a polyethylene filter (IMP), is made from tabulated data.

328

Hutchinson, D. H., 1955
and F. R. Holden.
AN INVENTORY OF AUTOMOBILE GASES. S.A.E. Trans., v. 63, 1955: 581-585. (Paper presented at the S.A.E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955)
DBS

Exhaust gases emitted from 10 automobiles operating in 4 driving conditions considered typical in Los Angeles traffic, were collected and analyzed by mass spectrometer. The loss of hydrocarbons out of the exhaust ranged from 5% of the weight of fuel entering the carburetor under steady driving at 30 mph to 19% for deceleration from 30 mph to 10 mph. It is estimated that a 60% reduction in the hydrocarbons exhausted into the atmosphere would be necessary to obtain conditions that existed in the relatively smog-free period before 1945. Data are presented in graphs and tables showing: (1) the hydrocarbon emissions from the producing, refining, marketing, and vehicular usage of petroleum products in Los Angeles County; (2) the average exhaust analyses for different gasolines, and under different driving conditions; and (3) the tons of C_1 to C_7 hydrocarbons discharged daily from vehicular exhausts over 3 selected traffic routes.

329

Hutchinson, D. H. 1955
AIR POLLUTION REDUCES THE AMOUNT OF SOLAR ENERGY REACHING THE EARTH .... S.A.E. Jour., v. 63, Dec. 1955: 29. (Summary of paper "Meteorology and Air Pollution" presented at S.A.E. Seminar on Fuels and Lubricants, Los Angeles, Apr. 6, 1955) DBS

The reduction by air pollution of the solar radiation reaching the surface of the earth is contrasted with the increase in atmospheric absorption of terrestial radiation caused by the increasing carbon dioxide concentration of the atmosphere. The solar radiation in Boston was reduced 18% during the Oct.-Mar. air pollution period. A decrease of 90% occurred during one heavy smog.

330 1955

HYDROGEN CLEANS UP FUELS. Chem. and Eng. News, v. 33, Dec. 5, 1955: 5306-5307.
DLC (TP1.C35, v. 33)

"Gulfining", or upgrading of distillate fuel oils by treating fuel oil distillate systems with hydrogen in the presence of a catalyst at elevated temperature and pressure, is a process developed by the Gulf Oil and the Gulf Research and Development Co. The hydrogen treatment results in 80 to 90% desulfurization of either virgin or catalytically cracked no. 2 fuel oil distillates; this eliminates the need for doctor-sweetening to improve odor by conversion of objectionable smelling sulfur compounds found in sour distillates. A comparison test on deposits, run in a rotary burner, showed the treated fuel reduced the volume of smoke deposits by 11%. It is considered that the use of the treated fuel in installations where air adjustment is not positioned for low smoke density could convert a borderline operation into a satisfactory condition.

331 1955

HYDROSTATIC DUST COLLECTOR. Indus. Chemist, v. 31, Jan. 1955: 39, illus.
DLC (TP1.I62, v. 31)

The new series ME dust collector has been added to the multiswirl models made by Dallow Lambert and Co., Ltd. This new series, employing a patent hydrostatic cross tube element, scrubs dust laden air in either water or oil. The illustrated model is designed to handle 1,000 cu ft/min. A hand-controlled valve allows for sludge removal.

332

Hyland, S. 1954
THE WAR AGAINST SMOKE; SOME EARLY CAMPAIGNS. Smokeless Air, v. 24, no. 89, Spring 1954: 123-125, 128. (Reprinted from The Manchester Guardian, n. d.)
DLC (TD884.S855, v. 24)

Some of the early (1819, 1821, 1842-1847) attempts to pass laws against air pollution in Great Britain are discussed. The first British committees and investigations concerning smoke emanating from steam engines and coal furnaces in factories are described. Smoke from private houses seemed to be the only contaminant that went unattacked. A plate showing 10 degrees of smoke concentration, submitted to the House of Commons in 1819, is included.

333 1956

IMPROVING AEROSOL ANALYSIS. Chem. Week, v. 78, Mar. 24, 1956: 88, illus.
DLC (TP1.C37, v. 78)

"Latest design in cascade impactors -- used for measuring aerosol particle size distribution is this model developed at Battelle Memorial Institute. Features: large samples can be analyzed in a short time, microscopic particle counting is eliminated, evaporation and nonrepresentative sampling are minimized. Shown with its designer, J. Mason Pilcher, the device was made for the Army Chemical Corps. It is intended for air-pollution, insecticide, etc., studies." (Quoted in full)

334 1955

IN PURSUIT OF PERFECTION. Chem. Week, v. 77, Oct. 15, 1955: 14. DLC (TP1.C37, v. 77)

The city of Philadelphia has raised money for an intensified "neighborhood-by-neighborhood, industry-by-industry" search for sources of air pollution. Even though millions of dollars have been spent for devices to reduce air pollution, Major Clark has warned that certain chronic offenders in this field will have to close their plants and move elsewhere if no other way can be found to eliminate contamination. The city's Air Pollution Control Board aims to "eliminate -- so far as practical -- all air pollution". Besides raising pollution-control funds by nearly 25%, the city is stopping open-dump refuse burning.

335 1955

AN INCINERATOR DESIGNED FOR A SUBURB. Amer. City, v. 70, Nov. 1955: 106-108.
DLC (HT101.A5, v. 70)

An incinerator of the suburban area north of Detroit, Mich. uses a storage pit, crane, and 3 furnaces to burn 450 tons of refuse/day. By charging participating municipalities $4.25/ton of refuse, the incinerator operates on a self-supporting basis. Residue from the furnace is collected in water-quenched hoppers, and gases are discharged from a 175-ft chimney. Fly ash, trapped with vertical baffles in the expansion chamber, is removed by a vacuum cleaning system. Waste gas from the incinerator flues is used in the steam boiler that heats the plant.

336
1953
THE INCINERATOR HAS TO BE BIG--AND IT HAS TO BE TIDY. Amer. City, v. 68, July 1953: 89-91. DLC (HT101. A 5, v. 68)

An incinerator plant at Hempstead, New York, by using steam generated by the boilers to produce heat, light and power, operates economically and at the same time provides greater protection than required by most air-pollution abatement standards. Fly-ash arrestors collect 90% of the fly ash greater than 15 microns, and the boilers cool the gases so that fly ash drops out more easily. Two induced-draft fans provide draft for the short 12-ft stacks. Detectors in the stack indicate and record the density of the flue gases.

337
1955
INDUSTRIAL AIR POLLUTION. Chem. Age, v. 73, Nov. 5, 1955: 995-997. DBS

The report of the Chief Inspector of Alkali... Works for 1954 is reviewed. Emissions in excess of statutory limits occurred in 24 cases, and the best practicable means of prevention were not used in 69 other cases. Dedusting facilities and washing of gas were used to remove sulfur oxides from boiler waste gases at electrical generating stations. The use of a scrubber irrigated with oil-gas was suggested to remove naphthalene vapors from coal gas. An average acidity of 1.84 grains of sulfur trioxide/cu ft of effluents was found in inspection tests of gases from lead chamber sulfuric acid plants. In 15 cases, the statutory limit of 4 grains/cu ft was exceeded. These plant infractions appear to result from carelessness, cold weather, or sudden high wind causing loss of draft control. Electrical precipitators reportedly were satisfactory in reducing the acid mist which occurs in contact acid plants when sulfur is burned to produce sulfur dioxide. "A concentration of mist as low as 0.25 grains/cu ft is said to be quite noticeable." Ammonia scrubbing kept the acidity at an acceptable figure, even at increased production; however, the cold, wet-washed gases had a corrosive effect on the discharge chimney. No limits are laid down for the acidity of the emissions from contact acid plants. They are subject only to the provision of the "best possible means" of control.

338
1956
[INDUSTRIAL STACKS]. Indus. Sci. and Eng., v. 3, Feb. 1956: 46. DCU

A subject covered by the American Society of Mechanical Engineers at their Diamond Jubilee meeting was the problems related to the increase of height of industrial stacks which results in decreased air pollution. Two types of steel stacks were studied: self-supporting and building-supported.

339
1955
INDUSTRY'S LOT: FAINT PRAISE AND NO PEACE. Chem. Week, v. 77, Oct. 1, 1955: 30-31, illus. DLC (TP1. C37, v. 77)

Even though the more than 40 chemical process plants along the Houston Ship Canal have made substantial progress in smoke and fume abatement, a new fight is breaking out against the companies; this time, however, the plants will have some strong arguments in their favor; even though plant production along the Houston Ship Canal is increasing by 25% each year, contamination in the past year has been reduced by the following amounts:

Organic dusts	virtually 100%
Chlorine gas	95%
Hydrochloric acid gas	94%
Hydrogen sulfide and mercaptans	55%
Sulfur dioxide and trioxide	34%
Over-all air pollution	16%

340
Ingram, W. T., 1953
and L. F. Dieringer.
A CRITICAL EXAMINATION OF AIR SAMPLING INSTRUMENTATION METHODS. Amer. Indus. Hyg. Assoc. Quart., v. 14, June 1953: 121-132. DLC

In this critical review of instrumentation and methodology for air sampling, the methods applicable to particulate matter, inorganic metals and salts, inorganic gases, organic substances, and miscellaneous mixed substances are discussed. Greater efficiency and considerable use of mechanized and electronically-timed devices are currently employed in collecting and estimating particulate matter; however, there has been little change from the methods of early workers based on the principles of filtration, impingement, ionization, and sedimentation. Many of the same instruments used for the collection of particulate matter are used in the collection of inorganic material. Weaknesses continue to exist in sampling periods of long duration. Efforts are being made to find testing procedures involving impregnated paper that will deliver spot samples. Methods for taking air samples containing gases have many limitations and are quite varied but, in general, fall into 2 main groups: those indicating the presence of the contaminant, and those absorbing devices which collect and sample so that a determination may be made later. A few examples are cited of methods currently used. Sulfur dioxide, and the complement of acid forming soluble gases, have been measured automatically and recorded by the autometer, and more recently the titrilog. The volumetric method is still standard in England.

341
Isaac, P. C. G. 1953
CURRENT LINES OF ATTACK ON THE SMOKE PROBLEM IN BRITAIN. Arch. Indus. Hyg. and Occupat. Med., v. 8, Sept. 1953: 212-218. DLC (RC963. A14, v. 8)

Smoke pollution caused by the burning of coal is considered. Since early in the 1950's large areas have been designated as "smokeless zones" where all fuel must be burned smokelessly. For larger installations, use of bituminous coal is permitted, but for domestic users, the use of smokeless fuels such as coke, low-temperature-carbonized fuels, gas, or electricity is required. Because of objections from domestic users, the plans for 3 large smokeless areas have been rejected. Owing to the fuel shortage in Britain, the problems of fuel economy and prevention of smoke pollution are closely bound together. Heating engineers are turning to plans for district, or large communal area, heating. Methods for flue-gas scrubbing for removal of sulfur dioxide are also described. In addition, the various recommendations of the Ridley Report [Committee on National Policy for the Use of Fuel and Power Resources, Cmd. 8647, Ministry of Fuel and Power] are listed.

342

1955

ISOLATE GASES THAT FORM SMOG IRRITANTS. Sci. News Letter, v. 67, May 21, 1955: 328.

DBS

L. M. Richards (Sanford Research Institute) reported at a meeting of the American Petroleum Institute in St. Louis that the gases in Los Angeles which form irritants in sunlight are primarily hydrocarbons, gasoline, and oil products. In experiments, the gases were separated from the air in a liquid oxygen trap, and the irritant-forming tendency of the hydrocarbons in light was noted.

343

Jaffe, G.,

W. Wittmann, and C. C. Bates. 1954

RADIOACTIVE HAILSTONES IN THE DISTRICT OF COLUMBIA AREA, MAY 26, 1953. Bull. Amer. Meteorol. Soc., v. 35, June 1954: 245-249, illus. DLC (QC851.A6, v. 35)

At about 2000Z, May 26, 1953 the District of Columbia experienced a hailstorm in which individual hailstones ranged up to the size of tennis balls. Determinations of the radioactive count of the water content of these hailstones and of roof gravels indicated that considerable material was brought to earth by the hailstorm from the explosion of the atomic cannon shell 29 hr earlier some 2000 airline miles away in Nevada. The airflow pattern at upper levels proved to have been around a high-pressure ridge located between the 2 sites. Such a pattern permitted the arrival of this radioactive material over the District of Columbia area within the time noted. (Authors' abstract)

344

Jephcott, C. M.,

and H. F. V. Wall. 1955

DETERMINATION OF QUARTZ OF VARIOUS PARTICLE SIZES IN QUARTZ-SILICATE MIXTURES. Arch. Indus. Health, v. 11, May 1955: 425-430. DLC (RC963.A14, v. 11)

A rapid and simple procedure for the determination of quartz in the presence of silicates has been devised by a modification of the phosphoric acid method. This procedure was tested on synthetic mixtures of quartz with other minerals. The quartz particles were of 2 sizes to represent fine and coarse dusts, and the quartz content of the mixtures varied from about 10 to 50%. It was found that the quartz content could be estimated with an absolute error of less than 1%.

345

Jobaris, J. N.,

J. E. Ebinger, J. H. Powell, and F. C. Burk. 1954

LPG [LIQUEFIED PETROLEUM GAS] BUSES OFFER LOW COST, CLEAN EXHAUST. S. A. E. Jour. v. 62, Mar. 1954: 17-23.

DLC (TL1.S5, v. 62)

The advantages of using buses fueled with liquefied petroleum gas are discussed. Tabulated data show that LPG is more economical than gasoline or diesel fuel in 3 cases out of 4. The fuel exhaust discharges no noticeable smoke or disagreeable odor. The fuel delivered to Chicago, Ill. has a sulfur content of less than 10 grains/100 cu ft of fuel. San Antonio, Tex. saves 1 to 1.5 cents/mi by using LPG fuel. Nevertheless, Harrisburg, Pa. terminated its tests with LPG-fueled buses because within a short time they noticed an economic loss; however, the maintenance required on LPG-fueled buses in Wichita, Kans. was lowered considerably.

346

Johnson, A. I.,

and J. M. L. Beeckmans. 1955

STATISTICAL FACTORS IN TOWER PACKING. Canad. Jour. Tech., v. 33, Nov. 1955: 434-444.

DLC (T1.C23, v. 33)

This investigation shows the correlation between the flooding rates in packed extraction towers and the random factors in the arrangement of the packing, which in this study consisted of 1/2-in. ceramic Raschig rings. The forms of the equations were predicted by an analysis based on certain simplifying assumptions. It was concluded that no exact prediction of flooding rates is possible, but the accuracy improved with a packing depth of 4 ft or more. (Authors' abstract in part)

347

Jones, H. G. 1955

SURVEY OF GRIT DEPOSITION FROM AN INTEGRATED STEELWORKS. Iron and Coal Trades Rev., v. 170, Apr. 15, 1955: 839-845, illus.

DLC (TN1.I7, v. 170)

A standard deposit gauge, developed at the Fuel Research Station (Gt. Brit.), was exposed to the atmosphere and monthly determinations of the grit deposited were made. A mathematical determination of these results, correlating the influence of wind directions, is shown graphically. Concluding that several sampling points would provide more representative data, 2 additional surveys were made. In the first survey, 16 sampling points were covered using petri dishes. The second survey, covering 64 sampling points, made use of a newly developed substandard gauge which is pictured. The individual-reading month for each sampling point, and the exact location of the sampling stand are illustrated in a block diagram. The tabulated results of an attempt to analyze the dust to determine its origin indicate that as yet the methods of sampling do not give conclusive evidence as to the dust sources.

348

Junge, C. 1955
THE SIZE DISTRIBUTION AND AGING OF NATURAL AEROSOLS AS DETERMINED FROM ELECTRICAL AND OPTICAL DATA ON THE ATMOSPHERE. Jour. Meteorol., v. 12, Feb. 1955: 13-25. DLC (QC851.A283, v. 12)

A first attempt at surveying the complete size distribution of natural aerosol particles is made. Roughly, 3 sources of natural aerosols can be distinguished: (1) particles condensed from smoke, etc.; (2) sea-spray particles which are limited to particle sizes above a radius of 5×10^{-5} cm and have number concentrations below 100/cc; and (3) dust particles from desert areas, with mean radii above 5×10^{-5} cm, so far as is known. The available data seem to indicate that the maximum number concentration is located in the size region between 10^{-5} and 10^{-6} cm radius, and that the number concentration drops to zero between 10^{-6} and 10^{-7} cm radius. The size range greater than 10-5 cm can be well represented by a power law which seems to hold for large parts of the world. It can be shown further, where ion and nuclei counts or other electrical data are available from a large number of places all over the world, that the average radius of all particles increased when the total number decreases. This can be explained by coagulation processes. It should be emphasized that the results obtained here are to be considered as a rough first approach, valid only for average conditions in time and space, and that more detailed information is needed to improve the knowledge of this field. (Author's abstract in part)

349

Kaiser, E. R., 1954
and C. H. Marks.
BCR ACTIVITIES FOR CLEANER AIR: 1953 AND 1954. Air Repair, v. 4, Nov. 1954: 151-154, 164. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The work of the national research organization for bituminous coal, Bituminous Coal Research, Inc., is reviewed. This organization is a major supporter of the Great Lakes air pollution abatement program. The improvement in smoke conditions from coal-fired vessels on the Detroit River is tabulated. Work on an improved spray type dust collector is described. Overfire jets were found to be effective in holding smoke emission from a small spreader-stoker-fire boiler well below requirements, but they did not improve the combustion of cinders. Other work of this laboratory is discussed. (Public Health Eng. Abstracts, v. 35, Apr. 1955: 1.)

350

Kanter, C. V., 1955
and I. S. Deckert.
CONTROL OF AIR POLLUTION FROM OIL REFINERIES IN LOS ANGELES COUNTY. Air Repair, v. 4, Feb. 1955: 197-202, 212. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Los Angeles County produces over 300,000 barrels/day of crude oil and has a refinery capacity of 687,000 barrels/day, which is over 8% of United States capacity, being exceeded only by the Gulf port area of Texas. The county has refineries of 7 major oil companies, plus 3 major petrochemical plants. It is estimated that 300 tons/day of hydrocarbons are emitted to the atmosphere by these operations. The principal methods used to reduce evaporation loss from storage tanks are: (1) floating roof; (2) variable volume vapor space; and (3) vapor recovery. Hydrocarbon emission can be cut to 100 tons/day by use of the above methods. County regulation for such control is quoted. Improvements described in flare and vacuum-jet design and operation will also decrease hydrocarbon emission to the atmosphere. Much equipment to recover hydrogen sulfide, sulfur dioxide, and mercaptans has been installed, and is described. Other minor sources of refinery air pollution and their control are described. (Public Health Eng. Abstracts, v. 35, May 1955: 1)

351

Katz, M. 1952
THE DETROIT-WINDSOR AIR POLLUTION STUDY. ENVIRONMENTAL STUDIES--GENERAL AREA SAMPLING. Publ. Health Rep., v. 67, July 1952: 664-666. DLC (RA11.B17, v. 67)

Environmental studies have been designed to determine the maximum and average air pollution as influenced by meteorological and other factors over a sufficiently long period, and to evaluate effects on health, economy, safety, and vegetation. The area under consideration, with about 3 million inhabitants, has an annual domestic and industrial consumption of coal and solid fuels of about 15 million tons on the United States side, and 650,000 tons on the Canadian side. It is estimated that approximately 430,000 tons of sulfur dioxide are emitted into the air annually from solid fuels alone; this is augmented by the combustion of natural gas, fuel oil, gasoline, and from chemical and mill operations. The rise and fall of the level of sulfur dioxide in the air has been chosen as an index of gaseous pollution since this gas is one of the major contaminants in quantity in the area, although other toxic gaseous contaminants such as hydrogen sulfide, chlorine, oxides of nitrogen, and ammonia have also been found. The pollution load shows marked seasonal as well as diurnal variations, and smogs of several days duration, accompanied by relatively high peak concentrations of sulfur dioxide, have occurred during temperature inversion periods. The possibility of a major disaster in the area is rendered unlikely only on the grounds of topography. Distribution of suspended particulate matter and deposited matter is being studied. About 20 metallic elements have been identified--the most abundant being calcium, silicon, aluminum, and iron--by x-ray diffraction and by spectrographic analyses of the inorganic components of the complex aerosols sampled.

352

Katz, M. 1955
ATMOSPHERIC POLLUTION STUDIES WITH PARTICULAR REFERENCE TO THE DETROIT-WINDSOR AREA. Air Repair, v. 4, Feb. 1955: 176-183. (Contributed as D. R. C. L. Report no. 148, Defense Research Laboratories, Ottawa, Canada) (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

For several years a group under a joint technical advisory board for the US and Canada has been engaged in an investigation of air pollution in the Greater Windsor-Detroit area for the International Joint Commission. The area under investigation lies on both sides of the Detroit River for a distance of about 30 miles and extends to about 15 miles inland from the river. The area is highly industrialized. Annual coal consumption amounts to about 15,650,000 tons, not including solid fuel consumed by vessel traffic on the Detroit River. About 430,000 tons of sulfur dioxide are released annually from this source alone. Other emissions include various products of combustion, sulfur compounds, halogen and nitrogen compounds, and metallic fumes, oxides and dusts, as well as heavy smoke from vessels plying the river. A comprehensive health study is in progress to determine the chronic effects on public health of long-continued exposure to pollutants. (Public Health Eng. Abstracts, v. 35, May 1955: 1)

353

Katz, M. 1955
NATURE, DISTRIBUTION AND DISPERSION OF CONTAMINANTS IN THE URBAN ENVIRONMENT. Eng. Jour., v. 38, Apr. 1955: 426-433.
DLC (TA1. E584, v. 38)

Stack discharges from the burning of coal, liquid and gaseous fuels, exhausts from vehicles, and smoke from ship stacks, have added to the increased presence of pollutants in the air of urban and industrial areas. Dustfall measurements have identified particles in size ranges from 5 to 100 microns. Reduced visibility is associated with suspended particles in the size range of 0.3-0.6 micron in diameter, while respiratory irritation is aggravated by particles in the 1-5 micron range. Measurements of dustfall and suspended particulate matter are summarized in tables, along with measurements of mean sulfur dioxide concentrations. The influence of the meteorological factors of winds, lapse rates, and temperature on the concentration of contaminants in the air are shown graphically. Daily and seasonal fluctuations are also plotted. A comparison of contamination in various cities is not always advantageous since methods of collecting data are varied. Studies have indicated that the interaction of some of the contaminants in the presence of sunlight or other catalysts may result in products more harmful than the original pollutants.

354

Katz, M., 1955
and V. C. Shore.
AIR POLLUTION DAMAGE TO VEGETATION. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 144-150, 182. (Paper presented at the 48th Annual Meeting of the Air Pollution Control Association at Detroit, Mich., May 22-26, 1955) DLC

In this study of air pollution damage to vegetation, the evidence on chlorophyll and pheophytin conversion in conifer leaves indicates that acid gases, such as sulfur dioxide in sufficiently high concentration, convert the chlorophyll pigments into the corresponding pheophytins. This process does not take place to an appreciable extent, however, unless the threshold value for sulfite in the living cells is exceeded. The effect may be produced by either relatively short exposures to high concentrations of gas or more prolonged exposures to lower concentrations. Transformation of an appreciable proportion of chlorophyll to pheophytin is accompanied by visible symptoms in the tissue, such as plasmolysis, shrinkage of cells, and fading of the normal green color. When these symptoms have progressed to the post-mortem stage, with no chlorophyll or pheophytin left and with anthocyanin pigment present, the color may change to red or reddish-brown, and then eventually to brown. These color changes are characteristic of conifers; in other species such as cereals or alfalfa, areas of bleached or ivory color appear. Deposits on leaves and in stomata from smoke and other aerosol contaminants in an urban environment may cause little, if any, discoloration, but can result in a reduction in the normal chlorophyll level. (Quoted in part)

355

Kaudy, J. C., 1954
and others.
FLUORINE CONTENT OF CITRUS LEAVES IN CALIFORNIA ORCHARDS. Citrus Leaves, v. 34, June 1954: 8-10. DA

A technique for analysis of fluoride content of citrus leaves was developed and checked for accuracy. Leaf samples from 130 different orange groves in Calif. were collected during the summers of 1952 and 1953. In those areas considerably removed from industry, the maximum average concentration of fluoride in the leaf material was about 1 ppm. Around Los Angeles a gradual increase in the concentration took place with the approach to a heavily industrialized area with levels as high as 57 ppm fluorine. Near Fontana, Calif. where a steel plant is located, the maximum concentration in the leaves was 211 ppm fluorine. The data on samplings from 12 groves in a variety of areas, over an 8-month period, showed that in all the groves there was an increase in fluoride levels with time, with the increase during July-Oct. being greater than that during Jan.-Mar. Other instances of high foliar fluoride near sources of air pollution in other sections of the country are discussed. Observations of this type have been reported where there are industries processing aluminum, bricks, ceramics, glass, iron, and miscellaneous chemicals. The amounts of fluoride found in citrus leaves and originating from the soil are normally low. Citrus leaves in areas not exposed to airborne fluoric materials contain low leaf concentrations of fluoride compared with other species in the area indicating that citrus leaves are poor accumulators when an atmospheric fluorine source is absent. Controlled experiments with fluorine exposure of citrus and other plants are planned.

356

Kay, K. 1952
ANALYTICAL METHODS USED IN AIR POLLUTION STUDY. Indus. and Eng. Chem., v. 44, June 1952: 1383-1387. DLC (TP1.I6, v. 44)

This literature review covers the following aspects of air pollution: (1) techniques for the collection of aerosols; (2) equipment and methods for the analysis of collected aerosols; (3) equipment and methods for the direct analysis of aerosols; and (4) analytical methods for the determination of gases and vapors in polluted air.

357

Kear, R. W. 1954
LABORATORY STUDIES ON THE USE OF COAL-TAR BASES AS INHIBITORS OF CORROSION BY FLUE GASES. Jour. Appl. Chem., v. 4, Dec. 1954: 674-679. DLC (TP1.S612, v. 4)

Experiments have been made to investigate the possibility of using coal-tar bases as inhibitors of the corrosion of steel surfaces by flue gases containing sulfur trioxide. In the first series of tests, the bases were sprayed into a town-gas flame with the object of minimizing the formation of sulfur trioxide in the combustion process; in the second series, the bases were sprayed into the gas stream with the object of depositing a protective film on the steel surface. The addition to the flame (gas flowing at 170 cu ft/hr) of up to 12 gal/hr of the bases reduced corrosion and rate of sulfuric acid deposition from gases containing 0.005% of sulfur trioxide (dew-point 138°) at all surface temperatures below the dew-point. When a liquid film was deposited on the steel, surface corrosion at temperatures below 117° was decreased, but some corrosion was induced at temperatures above the dew-point, i.e., 136°. (Author's abstract)

358

Kellogg, W. W. 1956
DIFFUSION OF SMOKE IN THE STRATOSPHERE. Jour. Meteorol., v. 13, June 1956: 241-250, illus. DLC (QC851.A283, v. 13)

Data from the High Altitude Dust Diffusion Project begun at Holloman Air Force Base, near Alamogordo, New Mexico, in the summer of 1949, have been analyzed, and the rates of growth of 18 smoke puffs produced in the upper troposphere and stratosphere are presented. There was an increase in the rate of growth of the cloud size with increasing height, and a decrease in the rate of growth of the cloud mass with increasing stability of the atmosphere. From an initial diameter of 15 to 20 m, the diameter of the smoke puffs increased fivefold in about 3 min, on the average. A theoretical analysis of the growth of smoke puff resulted in an equation describing the visual diameter as a function of time, and a variety of turbulence parameters. Comparison between theory and experiment, based on Taylor's theory of "diffusion by continuous movement," suggests that the root-mean-square eddy velocity in the stratosphere is of the order of 4 to 10 cm/sec and increases with height. (Author's abstract)

359

Kendrick, J. B., Jr., 1953
J. T. Middleton, and E. F. Darley.
PREDISPOSING EFFECTS OF AIR TEMPERATURE AND NITROGEN SUPPLY UPON INJURY TO SOME HERBACEOUS PLANTS FUMIGATED WITH PEROXIDES DERIVED FROM OLEFINS. (Abstract). Phytopathol., v. 43, Oct. 1953: 588. (Paper presented at the 6th Annual Meeting of the Pacific Division of the American Phytopathological Society, Santa Barbara, Calif., June 17-19, 1953) DA

Viroflay spinach grown for 10 weeks at a mean air temperature of 13°C, and then for 1 week at 24°C before exposure to the peroxides of certain olefins, was damaged 4 times as severely as those plants kept continuously at 13°C. Those plants with abundant nitrogen supply suffered 5 to 7 times as much as those which were nitrogen-deficient. Either romaine lettuce or endive showed only a trace of injury when grown for 10 weeks at 24°C, and a week at 13°C before exposure, and were severely injured when kept continuously at 24°C. Romaine leaves did not gain any tolerance to air pollutants, however, when the exposure period to 13°C temperature was for less than 4 days. Oats were damaged slightly if grown with an abundant nitrogen supply, and not injured if grown with limited nitrogen.

360

Kendrick, J. B., Jr., 1954
J. T. Middleton, and E. F. Darley.
CHEMICAL PROTECTION OF PLANTS FROM OZONATED OLEFINS (SMOG) INJURY. (Abstract). Phytopathol., v. 44, Sept. 1954: 494-495. (Paper presented at the 46th Annual Meeting of the American Phytopathological Society at Estes Park, Colo., Aug. 25-27, 1954) DA

Using the pinto bean, Phaseolus vulgaris L, as the test plant, it was found that injury such as that caused in Los Angeles and San Francisco (Calif.) areas by exposure to ozonated gasoline or hexene-1 could be prevented by sprays or dusts of zineb, ferbam, ziram, maneb, or thiram on plant surfaces. Protection was evident only when the lower leaf surfaces were adequately covered by the chemicals. Other sprays were not found to be effective, and with some plants, injury seemed to be increased. Plants dusted with zineb or thiram were damaged increasingly with increase in time between dusting and exposure to the phytotoxicant, to a maximum of 16 days. Also injury increased with increased toxicant-exposure times.

361

Kethley, T. W., 1952
M. T. Gordon, and C. Orr, Jr.
A THERMAL PRECIPITATOR FOR AEROBACTERIOLOGY. Science, v. 116, Oct. 3, 1952: 368-369, illus. DLC (Q1.S35, v. 116)

An experimental model of a thermal precipitator is described and illustrated. It is designed with an upper warmed plate and a cooled lower area so that airborne particles and bacteria are precipitated directly on the surface of cover slips. Tests indicate that the precipitator is effective at flow rates as high as 400 cc/min, and that particles are suspended evenly over the cover slip, the area covered depending on the flow rate, the distance, and the temperature difference between the hot and cold surfaces.

362

King, E. J., 1953
G. P. Mohanty, C. V. Harrison, and
G. Nagelschmidt.
THE ACTION OF DIFFERENT FORMS OF PURE SILICA ON THE LUNGS OF RATS. Brit. Jour. Indus. Med., v. 10, Jan 1953: 9-17, illus. DLC (RC963. A23, v. 10)

Pure silica exists at room temperature in the 3 crystalline forms of quartz, tridymite, cristobalite, and, the noncrystalline solid, fused silica. Suspensions of each of these 4 forms of silica, with particles below 2 microns in size, were injected intratracheally into the lungs of rats. Fused silica produced the least rapid pulmonary fibrosis, followed by quartz, then cristobalite, and finally tridymite. It seems probable that tissue activity is somehow related to the crystal structure of the dust, but this cannot be explained.

363

King, E. J., 1953
G. P. Mohanty, C. V. Harrison, and
G. Nagelschmidt.
THE ACTION OF FLINT OF VARIABLE SIZE INJECTED AT CONSTANT WEIGHT AND CONSTANT SURFACE INTO THE LUNGS OF RATS. Brit. Jour. Indus. Med., v. 10, Apr. 1953: 76-92, illus. DLC (RC963. A23, v. 10)

"Graded flint samples between $<$ 0.5 and 8 microns were given to rats by intratracheal injection on the basis of equal weights (50 mg/rat), and also on the basis of equal surfaces (700 sq cm/rat). With equal weights, the fibrogenic activity increased with decreasing [particle] size. Whereas the largest fraction gave only stage-2 fibrosis in 9 months, the smallest one gave stage 5 in 5 months. With equal surfaces the largest fraction went only to stage 3, and the smallest fraction to stage 4. The optimum fibrogenic size of flint particles in this type of experiment was between 1 and 2 microns equivalent diameter. Possible explanations for the falling off at both size ends are discussed." (Authors' abstract)

364

King, E. J., 1953
G. P. Mohanty, C. V. Harrison, and
G. Nagelschmidt.
EFFECT OF MODIFICATIONS OF THE SURFACE OF QUARTZ ON ITS FIBROGENIC PROPERTIES IN THE LUNGS OF RATS. Arch. Indus. Hyg. and Occupat. Med., v. 7, June 1953: 455-477, illus. DLC (RC963. A14, v. 7)

Animal experiments were carried out with rats to test the effect of surface modifications of quartz on its fibrogenic action in the lungs. Coating of the quartz surface with coal did not appear to modify its action since coated and uncoated quartz produced stage-5 fibrosis equally in 8 or 9 months, but since completeness of the coating could not be proved, this experiment was inconclusive. The outer layer of amorphous silica on fine quartz grains was removed by exhaustive leaching with Ringer's solution or by etching with hydrofluoric acid. The main conclusion is that removal of the amorphous layer does not reduce, and may enhance, the fibrogenic action of quartz, and that in samples of this type there is no parallelism between silica solubility determined in the test tube and fibrogenic effect in animals. (Authors' abstract in part)

365

King, E. J., 1956
S. H. Zaidi, and G. Nagelschmidt.
THE SILICA-SOLUBILITY THEORY OF SILICOSIS. Arch. Indus. Health, v. 13, Feb. 1956: 133-138. DLC (RC963. A14, v. 13)

Mice were injected intravenously with 10-mg amounts of various dust particles (flint, quartz, cristobalite, and tridymite), and their urine analyzed for silicic acid. These results were discussed in relation to earlier reports on the test tube solubility of the dust particles, and to the theory that the solubility of a silica dust was an indication of its pathogenicity. Many of the experimental findings which emerged were difficult to reconcile with this solubility theory of pathogenicity.

366

King, M. M. 1952
A DOUBLE-GRATE INCINERATOR. Amer. City, v. 67, Nov. 1952: 116-118.
DLC (HT101. A5, v. 67)

Details of construction and plant dimensions for an incinerator in Santa Monica, Calif. are given. Gases are reduced from a velocity of 36.4 ft/sec to 4.76 ft/sec in the combustion chamber, and the fly ash is settled. From the spray chamber where the gases are kept at temperatures not exceeding 600°F, the gases pass through an insulated duct to a 129-ft steel stack. Photoelectric smoke indicators are located in the stack and signal when the smoke density exceeds regulations. This incinerator operates at a cost of $0.437/ton with an over-all cost of $3/ton.

367

Kleinsasser, T. W., 1956
and R. C. Wanta.
THE DEVELOPMENT OF A FORECASTING SERVICE FOR USE IN AIR POLLUTION CONTROL. Arch. Indus. Health, v. 14, Oct. 1956: 307-318, illus. (Paper presented at the 1956 Annual Meeting of the Air Pollution Control Association at Buffalo, N. Y.)
DLC (RC963. A14, v. 14)

At the Kingston power plant of the Tennessee Valley Authority, waste gases are discharged into the atmosphere through high stacks at high speeds and are dispersed by the natural atmospheric turbulence and changes in direction of wind flow. In order to evaluate the effectiveness of these measures and to identify any need for additional controls, a series of studies have been undertaken to study meteorological factors which cause air stagnation. In the period from June 29, 1954 to Oct. 26, 1954, recordings of sulfur dioxide content of the air in the neighborhood of the power plant indicate that on 7 different occasions local weather conditions were favorable to the accumulation of waste gases. Forecasts of stagnation conditions are provided to the area by the Weather Bureau Office at Knoxville, Tenn. Because preventive measures take time to set in motion and are expensive, the question arises of developing accurate long-range forecasting methods and, possibly of making studies of local small-scale weather processes which accompany stagnation of the larger-scale weather patterns.

368

Kling, F. E. 1954
BLAST FURNACE DESIGN PROBLEMS. Blast Furnace and Steel Plant, v. 42, July 1954: 778-786. DLC (TN1. B7, v. 42)

Flue dust production can be controlled by conditioning the material before burning, and by improving furnace design. Less than 2% of the flue dust is collected in a dust catcher with a 20 mesh sieve, the remaining fine particles travel with the gas in the uptakes at 40 ft/sec. To be more effective, the uptakes should be inclined at an angle not less than 45°, and the dust catcher should be of a venturi type. Incorporating the venturi, controls the speed of the gas, and according to test results presented here the efficiency is increased to 85%.

369

Kopita, R. 1955
THE USE OF AN IMPINGEMENT BAFFLE SCRUBBER IN GAS CLEANING AND ABSORPTION. Air Repair, v. 4, Feb. 1955: 219-222, 232. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The impingement theory of wet gas cleaning is presented, and its application to a perforated impingement baffle plate scrubber developed by the Peabody Engineering Corp. is discussed in terms of the separation number $\frac{U_t V_o}{G_1 D_b}$, where U_t is particle settling velocity; V_o - average gas velocity of the impinging stream; G_1 - acceleration due to gravity; and D_b - representative dimension of body impinged upon. The scrubber utilizes the following basic actions: (1) Subdivision of the gas into many small streams; (2) directed impingement of the gas stream against water droplets or wetted targets; and (3) close contact between gas and liquid to insure adequate gas cooling and absorption of undesirable gaseous components. Its efficiency in removing particulate matter from gases was from lime kilns (98%); pyrite roasters (99%); blast furnaces (99%); pulverized coal firing (99%); and carbon black manufacture (95%). Hydrogen sulfide content of gas was reduced to less than 5 ppm.

370

Kotin, P., 1954
H. L. Falk, P. Mader, and M. Thomas.
AROMATIC HYDROCARBONS. I. PRESENCE IN THE LOS ANGELES ATMOSPHERE AND THE CARCINOGENICITY OF ATMOSPHERIC EXTRACTS. Arch. Indus. Med. and Occupat. Med., v. 9, Feb. 1954: 153-163, illus.
DLC (RC963. A14, v. 9)

Analysis of atmospheric samples, which were obtained by means of a large volume sample collector, showed the presence of carcinogenic hydrocarbons. Extracts from these samples were used experimentally to produce skin papillomas and skin cancers on C57 black mice. A second source of carcinogenic activity may result from the oxidation products of atmospheric hydrocarbons, since the chief characteristic of urban-polluted air has been shown to be its marked oxidizing capacity. The theoretical formation, under such atmospheric conditions, of epoxides and diepoxides--both of whose experimental carcinogenicity has been reported--is discussed.

371

Kotin, P., 1954
H. Falk, and M. Thomas.
AROMATIC HYDROCARBONS. II. PRESENCE IN THE PARTICULATE PHASE OF GASOLINE-ENGINE EXHAUSTS AND THE CARCINOGENICITY OF EXHAUST EXTRACTS. Arch. Indus. Hyg. and Occupat. Med., v. 9, Feb. 1954: 164-177, illus. DLC (RC963.A14, v. 9)

Carcinogenic hydrocarbons have been demonstrated experimentally as being among the emission products contained in gasoline engine exhaust gases. From traffic surveys, it was found that the amount of polycyclic hydrocarbons and soot emitted was maximal on acceleration, and decreased on deceleration and idling of the engine. Conversely, the amount of unburned gasoline liberated through the exhaust was maximal during deceleration, less during idling, and minimal on cruising and acceleration. The requirements for benzopyrene to be carcinogenic in the atmosphere, include the presence of soot, hydrocarbon aerosols, and hydrocarbon oxidation products; these requirements exist during idling. Benzene extracts of the particulate materials from engine exhausts have been used experimentally to produce skin papillomas and skin cancers in C57 black mice. Suspicion should be directed to the presence of these carcinogenic materials in the atmosphere in relation to the increase in lung cancer incidence.

372

Kotin, P. 1954
MEDICAL INVESTIGATION OF AIR POLLUTION. Arch. Indus. Hyg. and Occupat. Med., v. 10, Oct. 1954: 288-294, illus.
DLC (RC963.A14, v. 10)

An attempt to develop a research plan for study of morbid effects attributable to a local air-pollution situation in Los Angeles County, Calif. is outlined. In establishing the physical, chemical, and engineering criteria for synthetic reproduction of smog, not only the pollutants at their sources, but also the new products which may be formed after emission into the atmosphere must be considered. Since the chief characteristic of the Los Angeles smog is its marked oxidizing capacity, it was necessary to establish a method of chemical screening showing the total oxidants as well as the percentage contributed by each of the oxidizing substances. A series of questions was formulated to aid in obtaining further, inter-related, information. Since preliminary observations indicated that the concentration of pollutants was of greater significance than the exposure time, and that standard laboratory methods would not be sensitive enough to detect changes from exposures to realistic or naturally-occurring concentrations of oxidants, an exposure level of 4 ppm total oxidant was used. This level is 10 times that normally found in downtown Los Angeles at noon on a smoggy day. Both in vitro and in vivo testing was done. The problems of interpolation of experimental animal results to human studies was considered. Also it was necessary to simulate the cardiorespiratory diseases found to be present in many persons who had been affected by abnormal air-pollution concentrations.

373

Kudlich, R. (rev. by L. R. Burdick). 1955
RINGELMANN SMOKE CHART. [Washington, 1955], 3p. (Bureau of Mines. Information circular 7718, revision of Information circular 6888) DI

This circular gives the history of the chart and its method of preparation, in addition to instructions for its use. The chart consists of 4 sets of rectangular grills of black lines of definite width and spacing on a white background. At a distance from the observer, the lines of the chart merge into shades of gray. Smoke emission from a stack is determined by comparing the gray shade of the smoke emitted with the chart.

374

Kuroiwa, D. 1956
THE COMPOSITION OF SEA-FOG NUCLEI AS IDENTIFIED BY ELECTRON MICROSCOPE. Jour. Meteorol., v. 13, Aug. 1956: 408-410, illus.
DLC (QC851.A283, v. 13)

Electron-microscope studies were made of condensation nuclei to determine the nature of nucleus residue contained in individual fog droplets. By carrying out condensation tests, examinations through electron-microdiffraction techniques, and acid treatments by use of a micromanipulator, sea-fog nuclei have been divided into 3 broad classes: sea salt, combustion products, and soil materials. Of the 225 nuclei investigated, about 50% are combustion products, 40% are sea salts, and the remaining 10% are soil materials; 80% of all the sea-salt nuclei have dimensions larger than 1 micron. The writer warns against drawing too definite conclusions as to the composition of sea-fog nuclei from these few studies, and gives this tentative view of the situation: sea-fog is created and transported within the lower atmosphere, which is stable and consequently more or less polluted; therefore, it is no wonder that combustion products have frequently been found in the nucleus residue of sea-fog droplets. (Author's abstract in part)

375

Kurtz, J. K. 1955
RECOVERY AND UTILIZATION OF SULPHUR FROM COKE OVEN GAS. Chapter 19. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 215-221.
DLC (TD883.I5, 1955)

This report describes the facilities, at the Sparrows Point (Md.) plant of the Bethlehem Steel Co., for desulfurizing coke oven gas to be used in open-hearth furnaces, and for producing sulfuric acid by the contact process from the removed hydrogen sulfide. The hydrogen sulfide emitted was reduced from an average of 406 to 65 grains/100 cu ft, and the cost of gas desulfurizing was [$].018/1000 cu ft.

376

1955
L. A. KEEPS ULTRAVIOLET EYE ON SMOG. Chem. Week, v. 76, May 14, 1955: 107, illus.
DLC (TP1.C37, v. 76)

"Artillery for Los Angeles' battle against air pollution is sighted in by Dr. Roger S. Estey, vice-president of Borman Engineering, Inc. (North Hollywood, Calif.). The instrument, an ultraviolet projector (illustrated) is the first photoelectric instrument to be developed for continuous, automatic measurement of atmospheric ozone. Now used only to monitor this dangerous smog suspect, the projector may later help to chart its distribution pattern, ferret out the source." (Quoted in full)

377

LaBelle, C. W., 1955
and H. Brieger.
THE VAPOR TOXICITY OF A COMPOSITE SOLVENT AND ITS PRINCIPAL COMPONENTS. Arch. Indus. Health, v. 12, Dec. 1955: 623-627, illus.
DLC (RC963.A14, v. 12)

Experimental exposure of laboratory animals to the vapors from a mixture of solvents, and to the individual solvents according to their respective proportions within the mixture, failed to show sufficient differences in acute toxicity to warrant any expression of synergistic or antagonistic effects of the mixture. The acute and chronic toxicities of the mixed vapor were found to be close to that of its principal component, methylethylketone. Other solvents in the mixture were: proplyene formal; 1,3-amylene oxide; tetrahydrofuran; 1,3-butylene oxide; dimethyl acetal; propylene acetal; and acetone. The study has resulted in a method for determining vapor toxicities of a composite solvent in relation to its components.

378

Laidlaw, S. 1954
THE EFFECTS OF SMOKE POLLUTION ON HEALTH. Jour. Inst. Fuel, v. 27, Feb. 1954: 96-99.
DLC (TP315.I6, v. 27)

Some of the aspects of smoke pollution which may have an effect on health are discussed generally. Diminution of sunlight leads to lowered vitality and lowered resistance to infection; the bactericidal effect of sunlight is decreased; ultraviolet rays are readily lost in a dusty atmosphere and can not act on the ergosterol of the skin to synthesize vitamin D which is necessary for building healthy bones and teeth. Solid impurities of the air (dust, soot, and fog) contribute to ill health in various degrees, as do the gaseous impurities (sulfur dioxide, fluorine, carbon monoxide, and tobacco smoke). The possible role of atmospheric pollution in the increase in the incidence of bronchial carcinoma is mentioned. The economic aspects of air pollution are discussed in relation to crops and soil; fuel waste from incomplete burning; extra costs of heating, lighting, and cleaning; and deterioration of building exteriors.

379

LaMer, V. K., 1953
and S. Cotson.
THE GROWTH AND SHRINKAGE OF AEROSOLS. Science, v. 118, Oct. 30, 1953: 516-517.
DLC (Q1.S35, v. 118)

A nonvolatile aerosol, composed of minute droplets of dioctyl phthalate (DOP) suspended in air, was introduced into a flask whose bottom and side walls were wetted with a master solution containing DOP and a miscible volatile solvent such as toluene. The aerosol droplets grew with extreme rapidity by absorbing the ambient vapor of the volatile solvent; equilibrium was reached in a few sec or less, and persisted for a considerable time. When the grown aerosol was passed into a second vessel containing a master solution with a lower proportion of toluene, the aerosol diminished in size, attaining equilibrium with the second master solution almost immediately. Further studies were attempted on the effect of a surface film of contaminant material on the rate of shrinkage of aerosols; it was hoped that the information obtained would explain the frequently reported failure of smogs to evaporate when the relative humidity becomes lower than the equilibrium value. Technical difficulties, however, were encountered in finding a contaminant which would not be soluble in toluene and still yield an aerosol which was monodisperse.

380

Landgraf, G. E. 1955
CLEAN AIR AIDS RESEARCH INSTITUTE. Heating, Piping, and Air Conditioning, v. 27, Apr. 1955: 102-105, illus.
DLC (TP7201.H45, v. 27)

An air filtering system for cleaning intake air as well as exhaust air has been installed at the Mellon Institute in Pittsburgh, Pa. The system, as illustrated, is capable of supplying 191,575 cu ft/min and exhausting 313,235 cu ft/min of air by means of a battery of fans. Of the total air supplied, 159,575 cu ft/min is electrostatically cleaned. Dust spot tests indicate that 90% of the contaminants are removed including particles as small as 0.1 micron.

381

Landsberg, H. 1954
and E. E. Escher
POTENTIOMETRIC INSTRUMENT FOR SULFUR DETERMINATION. Indus. and Eng. Chem., v. 46, July 1954: 1422-1428. DLC (TP1.I6, v. 46)

An automatic instrument is described which continuously records trace quantities of oxidizable sulfur compounds in gases and atmospheres. Coulometric titration with electrolytically generated bromine is electronically controlled at a potentiometric balance point. A diagram of the titration cell, and an example of the continuous record are illustrated. A graph is given showing the linearity for sulfur dioxide for 4 different titration cells. The sensitivity of this method is directly proportional to the flow rate, and the range is indirectly proportional. The instrument is applicable to the determination of total air pollutants in concentrations less than 0.1 to 4 ppm. (Authors' abstract in part)

382

Larsen, S. H. H. 1955
VERTICAL DISTRIBUTION OF ATMOSPHERIC OZONE AT LONGYEARBYEN, SPITZBERGEN (78°N). Jour. Atmospheric and Terrestrial Phys., v. 6, Jan. 1955: 46-[illegible]. DLC (QC801.J6, v. 6)

The vertical distribution of ozone in the atmosphere was calculated from 3 Umkehr-curves, and the results are tabulated. A graph illustrates the change in ozone/air ratio with increasing height.

383

Larson, G. P. [1952]
PROGRESS IN SMOG CONTROL. In California. Legislature. Assembly. Interim Committee on Air and Water Pollution. Final Summary Rep., [Sacramento], Assembly of the State of California, [1952], p. 77-83, illus. DLC (TD425.C315)

Smog control measures including new methods and instruments are discussed. Four charts are presented. The first indicates the number of days/month when visibility was less than 2 mi. Chart 2 shows the monthly average visibility recorded in downtown Los Angeles, Calif., for 2 different wind speeds. Data for the year indicate that up to Nov. 20, 1948, there were 53 days on which eye irritation occurred. For the same periods in 1949 and 1950, there were 50 and 36 days, respectively. The third chart indicates the monthly average concentration of sulfur dioxide at all recording stations in 1949 and 1950. Chart 4 presents the daily average cycle of sulfur dioxide concentrations at a station for Oct. 1949 and Oct. 1950. It is concluded that smog control has improved at least 35% and will continue to improve. It is also noted, however, that "hydrocarbon losses," which were not considered in this paper, are now known to provide the greatest quantity of polluting material, and are of great significance from the standpoint of eye irritation, crop damage, and reduction in visibility.

384

Larson, G. P., 1953
G. I. Fischer, and W. J. Hamming.
EVALUATING SOURCES OF AIR POLLUTION. Indus. and Eng. Chem., v. 45, May 1953: 1070-1074. DLC (TP1.I6, v. 45)

An analysis of the sources and quantities of various pollutants in the Los Angeles, Calif. area is given. Data collected from analyses of the atmosphere over downtown Los Angeles indicate the concentrations of various gases and aerosols during periods of intense smog and good visibility. A schematic diagram shows the pollutants, and reactions involved among pollutants, that are associated with various damaging effects. In estimating pollution, correlations are made between the amount of pollutant emitted and the amount of material used, as shown by tabular data. Pollution by gases and vapors may be considered to be a function of the dispersion volume, which is varied by wind velocity and inversion height. Aerosols, calculated as reduced visibility, are of 3 types: (1) solid particles, (2) sulfuric acid mist, and (3) ether-soluble material. Air sampling in Los Angeles has shown that 95% of the aerosols are less than 1 micron in diameter. It was stated that air pollution increased during the period 1940-1948, but because of pollution controls has decreased since that time.

385

Larson, G. P. 1953
AIR POLLUTION AND MAN'S HEALTH IN LOS ANGELES. Publ. Health Rep., v. 68, Sept. 1953: 872-874. DLC (RA11.B17, v. 68)

Air pollution in Los Angeles, Calif. can be related to such effects as reduction in visibility, eye and throat irritation, vegetation damage, and local nuisance. Aerosols, gases, and vapors are the principal ingredients of smog. Dusts, smoke particles, and condensed fumes are obvious pollutants which are detrimental because of physical characteristics causing reduction of visibility. Certain atmospheric conditions or reactions within the air often produce more toxic substances, such as the oxidation of sulfur dioxide to sulfur trioxide, and the formation of sulfuric acid mist. A tabulation is given of the analysis, by microquantities, of materials in samples of air taken during intense smog conditions in Los Angeles.

386

Larson, G. P., 1955
J. C. Chipman, and E. K. Kauper.
DISTRIBUTION AND EFFECTS OF AUTOMOTIVE EXHAUST GASES IN LOS ANGELES. S.A.E. Trans., v. 63, 1955: 567-574. (Paper presented at the S.A.E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955) DBS

This study showed that the hydrocarbon emissions from downtown Los Angeles automotive traffic were apparently sufficient to cause eye irritations and smog effects. By comparison, the effects caused by hydrocarbons from refineries, smoke particles, diesel exhausts, and by gasoline additives such as lead were slight. It was concluded that, in order to relieve smog effects and decrease ozone content in the Los Angeles area, 90% of the hydrocarbons must be removed from automobile exhaust gases. Tables are given showing the: (1) typical analysis of automobile exhaust gases; (2) laboratory measurements of damage caused to indicator plants by various concentrations of automobile exhaust gases and gasoline; and (3) classification of air pollution sources and their potential air contaminants.

387

Larson, G. P. 1956
THE CONTROL OF ATMOSPHERIC POLLUTION. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 209-212, 248. (Excerpts from a paper presented before the National Convention of the American Association for the Advancement of Science, Section M, Symposium, Berkeley, Calif., Dec. 30, 1954) DLC

The control of atmospheric pollution is accomplished principally in 3 ways: (1) the reduction of the source of air pollution by the installation of, or operational changes in collection equipment such as centrifugal collectors, electrical precipitators, cloth filters, wet collectors, and vapor control devices (absorbers, adsorbers, incineration flares); (2) the dilution of the source of air pollution, e.g., the use of tall stacks; and (3) the allocation of the use of land to prevent pollution concentrations in certain areas. This is accomplished by city zoning restrictions, and plans to prevent possible pollution concentrations in future industrial developments.

388

LaTorre, P., 1955
and L. Sullivan.
COLLECTING EFFICIENCIES OF FILTER PAPERS FOR SAMPLING LEAD FUME. Arch. Indus. Hyg. and Occupat. Med., v. 11, 1955: 243-250, illus. DNLM

Some of the limitations are mentioned of both the impinger and the electrostatic precipitator in the collection of lead fumes. Several commercially available analytical filter papers were tested to determine which were best suited for field sampling of airborne lead from the standpoint of resistance, efficiency, and uniformity. Tests were made with lead fumes produced by 4 different methods, including the burning of tetraethyl lead. The collecting efficiency of 5 of these filter papers was high (greater than 75%), and fairly uniform (5% average deviation). Electron micrographs of these fumes indicated mean sizes in the 0.01- to 0.05-micron range. Discrete particles as small as 0.005 micron were recognized, but the fields contained large numbers of aggregates, some as large as 0.6 micron. (Authors' abstract in part)

389

Lauterbach, K. E., 1954
and others.
EFFICIENCY STUDIES OF THE ELECTROSTATIC PRECIPITATOR. Arch. Indus. Hyg. and Occupat. Med., v. 9, Jan. 1954: 69-75, illus. DLC (RC963.A14, v. 9)

Tests of the electrostatic precipitator in collecting a radioactive aerosol have shown that the instrument retains a uniformly high percentage of airborne particulate material. The percentage of dust penetration through the precipitator was calculated from the original aerosol activity, and the activity of the deposit collected on 3 molecular filters in series following the test instrument. The method of testing has been found to give reproducible results in estimating penetration values as low as 0.005%. Based upon a number of tests of molecular filters in series, the efficiency of this filtering medium appears to be extremely high. (Authors' abstract)

390

Lauterbach, K. E., 1956
A. D. Hayes, and M. A. Coelho.
AN IMPROVED AEROSOL GENERATOR. Arch. Indus. Health, v. 13, Feb. 1956: 156-160, illus. DLC (RC963.A14, v. 13)

The design and use of an aspirator for the production of heterogeneous aerosols is described. Surface tension forces the solution to be aspirated up the sides of the jet tube--held slightly above or below the surface of the solution--and around the jet opening. The aspirator has been tested with the jet tube in each of these positions, using 3 different concentrations of a sodium chloride solution. Using the solution of greatest concentration (10%), an average aerosol concentration of 657 mg/cu m was obtained. The concentrations of the aerosol varied very little when tested over a 6-hr period. The aerosol concentration was found to be proportional to the concentration of soluble material in the aspirated solution. Mean particle size values of the aerosol were also dependent upon the solution concentration. A 10-fold increase in the sodium chloride content of the test solution doubled the mass-median diameter of the aerosol.

391

Leach, L. J., 1953
and others.
SEMIPORTABLE AIR-SAMPLING SYSTEM. Arch. Indus. Hyg. and Occupat. Med., v. 8, Sept. 1953: 382-383, illus. DLC (RC963.A14, v. 8)

A semiportable air-pumping system for aerosol sampling, using the cascade impactor and the filter-paper dust sampler, is described briefly and illustrated.

392

1955

LEADED-GAS FUMES PURIFIED BY CATALYST. Food Processing, v. 16, Nov. 1955: 61. DLC (TP373.F55, v. 16)

A catalytic muffler, installed on trucks and plant vehicles, removes up to 90% of the carbon monoxide, aldehyde, and hydrocarbon fumes from exhausts. The exhaust gases are drawn over a horizontal row of chambers containing small catalyst pellets, and are burned by a catalytic chemical action to carbon dioxide and water.

393

Leeper, H. M., 1956
and C. L. Gable.

OZONE CRACKING OF RUBBER -- OBJECTIVE EVALUATION THROUGH CREEP MEASUREMENT. Rubber World, v. 134, Aug. 1956: 703-708, illus. DLC (TS1870.I4, v. 134)

A test, involving continuous creep of ring specimens, has been designed to allow continuous, objective, and nondestructive measurement of the extent of ozone cracking of vulcanized elastomers. The test, which lasts from 1 week to 1 or 2 months, is also used to evaluate the effectiveness of antiozonants incorporated in the rubber. Within the limits of the experiment, the creep observed is said to result from ozone cracking rather than to oxidative deterioration. Reasonably good correlation with other ozone resistance tests was found.

394

Leigh-Dugmore, C. H. 1952

THE OZONE CRACKING OF RUBBER. Rubber Age and Synthetics, v. 33, Nov. 1952: 398-399. DLC (TS1870.R65, v. 33)

It is now generally accepted that exposure-cracking occurs when rubber surfaces are stressed in the presence of ozone, and is usually more dangerous than crazing, which is a light energized surface oxidation that occurs alike in stressed and unstressed surfaces and can even be beneficial in allaying the effects of ozone. The number and size of the cracks depend on the degree of stress (or strain), on the concentration of ozone in the atmosphere, on the exposure time, and on the temperature. There is an interval between the beginning of exposure to ozone and the appearance of the first visible cracks; new cracks continue to form for a period and later no more, or very few, appear. At higher stresses or ozone concentrations the first cracks appear earlier, and the period during which new cracks form is shortened. More cracks form at high stresses than at low. Once a new crack has formed, it begins to grow in length and depth normal to the direction of stress in the rubber. The term "critical elongation" has been rather loosely used in the literature. At high or low strains, it is said, cracking is seldom serious; dangerous cracking usually occurs at intermediate elongations between 5% and 25%. The elongation within this intermediate region at which cracking may be most serious will vary with circumstances. (Atuhor's abstract in part)

395

Leigh-Dugmore, C. H. 1954

SIMPLIFIED PARTICLE-SIZE CALCULATIONS. Nature, v. 174, Sept. 18, 1954: 567, illus. DLC (Q1.N2, v. 174)

Particle-size analysis by microscopical methods often provides large samples of measurements which then need numerical analysis to give estimates of average diameters, specific surface, etc. When particle sizes are log-normally distributed, tedious summation of powers of the sizes can be avoided if the cumulative distribution is plotted on log-probability paper. Using such graphs, theories and equations for the use of a simple and completely graphical method for calculating particle-size data are outlined and discussed. It is suggested that the method be used as a rough check on calculations by some longer method, or for obtaining quickly approximate information from a sample of material about which something is already known so that unexpectedly large or small estimates of standard deviation can be recognized readily. (Author's abstract in part)

396

Lessing, R. 1956

DISPOSAL OF COLLIERY WASTES. Smokeless Air, v. 27, Autumn 1956: 40-48. DLC (TD884.S855, v. 27)

Piles of wastes from various coal mining operations present problems in smoke abatement. In a recent survey of these piles, 261 were found to be producing noticeable amounts of smoke and fumes containing carbon dioxide, carbon monoxide, sulfur compounds, hydrocarbons, and water vapor. The fires were caused by spontaneous combustion within loosely piled wastes. It has been shown that these wastes have caloric values of 2,500-5,000 Btu/lb, which might be recovered for fuel with the proper type of equipment. These fires might be prevented by sorting and packing the wastes firmly, or by spraying the piles.

397

1955

LIGHTNING CAN STRIKE TWICE. Chem. Week, v. 76, July 23, 1955: 14. DLC (TP1.C37, v. 76)

Three attempts to collect for damages allegedly caused by air pollutants from chemical process plants are included in a list of suits against chemical process companies. "At Bartow, Fla., a citrus grower is suing International Minerals & Chemical Corp.--operator of a nearby phosphate plant-- for $20,000. A growing number of residents of Santa Cruz, Calif., are suing Santa Cruz Portland Cement Co. for a total of more than $1 million. An attorney at Clarkston, Wash., had sued the Potlach Forest pulp and paper mill for $2,000, including $750 as damage to paint. But when a San Francisco laboratory executive testified that only about 1% of the paint's chalking and cracking could be attributed to smoke from the mill, the jury fixed damages at $7.50." (Quoted in part)

398

Liimatainen, R. C., 1956
and W. J. Mecham.
REMOVAL OF HALOGENS, CARBON DIOXIDE, AND AEROSOLS FROM AIR IN A SPRAY TOWER. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 17-20, 49, illus. DLC

A description is given of tests conducted on a multiple-nozzle spray tower designed to remove highly reactive and toxic halogen compounds (bromine pentafluoride, bromine trifluoride, etc.) that might be carried in the exhaust air from a laboratory area using these materials. Previous spray-tower studies are extended to larger scale operation and to some additional materials--iodine, carbon dioxide, and aerosols. As a preliminary check on the operation of the equipment, absorption tests of carbon dioxide in its normal atmospheric concentration were made, obtaining spray-tower efficiencies which gave a comparison with other carbon dioxide absorbers; absorption efficiency was obtained as a function of gas rate, liquid rate, and carbon dioxide, potassium hydroxide, and potassium carbonate concentrations. The effectiveness of the scrubber in removing toxic halogen vapors was measured by sampling the air stream at the exit and entrance to the tower. In order to observe the performance of the spray tower as a contacting device to remove aerosols (ammonium chloride and sodium oxide), tests were conducted on fumes of a size range commonly encountered in air-cleaning practice. A description of the equipment is given, as well as tabular data on results of all tests.

399

Linsky, B. 1953
AIR POLLUTION AND MAN'S HEALTH IN DETROIT. Publ. Health Rep., v. 68, Sept. 1953: 870-872. DLC (RA11. B17, v. 68)

The Bureau of Smoke Inspection and Abatement was reorganized on an engineering-control basis when the present air pollution control program was begun in 1947 and a new ordinance was enacted. The air pollution control ordinance in Detroit, Mich. is enforced primarily by obtaining compliance, court action being resorted to only for recalcitrants. Visible air pollution is controlled by 15 district air pollution inspectors as well as an observer for the bureau who dispatches 2 radio-equipped automobiles manned by air pollution inspectors. Street-level samplings are obtained to evaluate the need for corrective measures, and stack samples are taken when necessary to evaluate air pollution at a source. Research and development are encouraged by large industries or city-operated plants when no technical controls are available for specific air pollution emissions, and several such large projects are going on. About $14 million have been spent in direct air pollution control in a 5-yr period. As a result horizontal visibility has increased measurably, fly ash has been reduced greatly, and smoking chimneys are fewer and less frequent. A byproduct of Detroit's request for abatement of the nuisance caused by smoke from ships plying the Detroit River, has been the organization of the Detroit-Windsor air pollution study of the International Joint Commission of the United States and Canada.

400

1954
LIQUID-PRECIPITATING DUST-REMOVAL SYSTEM IN LOW-COST HOUSINGS. Utilization, v. 8, May 1954: 43, illus. DLC (TP315. U85, v. 8)

"A new-type liquid-precipitating stack-gas scrubber has been developed for installation in low-cost housings of cinder block, concrete, and fabricated steel construction. All connections are made to existing ducts with no need for complicated piping. Neither cloth bags or filters are used. The scrubbers remove dust particles of submicron sizes even at extremely high dust loadings. Eight models are available to handle high-temperature gases in capacities from 8,000 to 60,000 cu ft/min. Some of the special features of the operation are: the use of considerably less water than required in ordinary scrubbers; the elimination of the danger of serious overload on the fan by use of low back-pressure; economical operation; and the application of a chemical solution, Compound M, to improve the efficiency of removal of entrained solids from the gases, and to speed the water clarification in the settling tank by causing the solids to settle instead of remaining in suspension." (Quoted in part)

401

List, R. J. 1954
ON THE TRANSPORT OF ATOMIC DEBRIS IN THE ATMOSPHERE. Bull. Amer. Meteorol. Soc., v. 35, Sept. 1954: 315-325, illus. DLC (QC851. A6, v. 35)

The tremendous heat source resulting from the detonation of a nuclear weapon in the atmosphere produces a bouyant bubble of intensely hot gases which serves not only to carry aloft the debris resulting from the fissions and subsequent disintegration of the bomb casing and auxiliary equipment but also to suck up great amounts of soil and dust, much of which is rendered radioactive. Collections of radioactive debris were made daily at 120 Weather Bureau stations throughout the United States during the atomic test series in Nevada in the spring of 1952. The measuring techniques employed, and the meteorological factors involved in the transport and deposition of debris are discussed. (Quoted in part)

402

1955

LITTLE CAUSE FOR COMPLAINT: POLLUTION PROBLEMS ARE GETTING STICKIER. Chem. Week, v. 76, June 25, 1955: 41.
DLC (TP1. C37, v. 76)

"Pollution is strictly a regional worry --- better in some areas than it has been in years, in measurably worse in others. In California, management representatives are rejoicing over a new state pollution law, significant in several aspects. Most importantly, the bill (for the first time in California) takes a philosophical approach to pollution tangles. It is a corrective rather than a punitive system. All plants will be required to register nature, composition, and extent of all effluents --- with an analysis certified by a 'professional engineer'. On the basis of this information, citations will be handed out, if, in the opinion of the regional director, the plant is polluting the atmosphere. In such cases, open hearings will be held before a committee made up of a lawyer, a professional engineer, and a John Doe. If any company refuses to comply with the committee's findings, the case will then be handed over to the district attorney for prosecution." (Quoted in full)

403

Littlejohn, R. F. 1952
THE INFLUENCE OF ZINC OXIDE SMOKES ON THE OXIDATION OF SULFUR DIOXIDE IN COAL-GAS FLAMES. Jour. Appl. Chem., v. 2, June 1952: 289-294, illus. DLC (TP1. S612, v. 2)

The effect of zinc oxide smoke additions on the dew point and sulfur trioxide content of an aerated coal-gas flame containing sulfur dioxide has been studied. Measurements on filtered and unfiltered gases show that the presence of smoke tends, at first, to increase the amount of oxidation of dioxide to trioxide; but if sufficient smoke is present, the trioxide formed is absorbed, and zinc sulfate is formed. (Author's abstract).

404

Littman, F. E., 1953
and J. Q. Denton.
DEVELOPMENT OF AN INFRARED SPECTROMETRIC METHOD FOR THE MONITORING OF ORGANIC SUBSTANCES IN THE ATMOSPHERE. In American Chemical Society, Division of Petroleum Chemistry and Division of Water, Sewage, and Sanitation Chemistry Joint Symposium on Industrial Waste Disposal Problems of the Petroleum Industry no. 25, Mar. 15-19, 1953. Los Angeles, California. [1953] p. 127-139.
DLC (TD899. A5, 1953)

Infrared techniques were used to study the organic constituents of the Los Angeles, Calif. atmosphere. The instrument chosen is essentially an infrared colorimeter developed by the Shell Development Co., and designed to operate in the 3- to 3.5-micron range. A photograph of the instrument and a diagram of the essential working system are presented and described. After testing several gases, propane was chosen to fill the detector cell, 5% propane in argon providing the most desirable sensitivity. Of the 2 test gases used, namely a mixture of 75 ppm of propane in nitrogen or about 1% water in nitrogen, the second was selected. The results are reported in equivalent concentrations with respect to a reference gas, which in these tests was butane. Interferences were removed in 1 of 4 ways: (1) filtration ahead of the sample cell; (2) compensation, which sensitizes one cell for the desired compound, and the other for the combined interference and desired compound; (3) the use of semitransparent shutters; and (4) the removal of the interfering substances by physical methods. The results of various tests are summarized in tabular and graphical form.

405

Littman, F. E., 1953
and R. W. Benoliel.
CONTINUOUS OXIDANT RECORDER. Analyt. Chem., v. 25, Oct. 1953: 1480-1483.
DLC (TP1. I615, v. 25)

The unusually high concentration of an oxidant, which appears to be ozone, in smoggy Los Angeles, Calif., air is one of the few distinguishing characteristics of the local atmosphere. In order to study the relationship between the occurrence of smog, and the fluctuation of the oxidant concentration, a continuous recorder was built which produces a direct reading record of oxidant concentration in terms of ozone equivalent. The instrument consists essentially of a continuous air-liquid contacting device and a recording colorimeter. It is based on the liberation of iodine from a buffered, neutral potassium iodide solution by the oxidant. The light transmittance of the resulting yellow solution is measured by a double-cell colorimeter and continuously recorded on a strip chart. The contacting solution is regenerated by passing it through a bed of activated carbon, and is reused. By maintaining constant air and liquid flows, it is possible to calibrate the instrument directly in terms of ozone equivalents in pphm by volume. Thus, a continuous, pen-drawn record of the fluctuation of the oxidant level can be obtained. Satisfactory performance for 18 months was achieved, and an excellent positive correlation was established between the oxidant and smog, as manifested by reduced visibility, eye irritation, and crop damage. (Authors' abstract)

406

Littman, F. E., 1956
H. W. Ford, and N. Endow.
THE FORMATION OF OZONE IN THE LOS ANGELES ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 171-175, illus. (Paper presented at the 128th National American Chemical Society Meeting, Minneapolis, Minn., Sept. 11-16, 1955)
DLC

"The observation that oxidant could be formed experimentally by action of light on polluted urban air led to an investigation of those impurities in air which, upon irradiation, formed oxidant. The term 'oxidant precursors' was coined to describe these materials, and a series of experiments was initiated to determine their physical and chemical properties. A successful technique for collection and concentration of substances yielding oxidant on irradiation was evolved using freeze-out traps. Air was drawn through a semicarbazide column and a caustic scrubbing column. The stream was then split: one half passed through an irradiated flask and then into a series of dry-ice and liquid oxygen-cooled traps; the other half passed through a dark flask on its way to the traps. The samples were analyzed by using infrared, ultraviolet, and mass spectrometric methods, as well as chemical means to detect oxides of nitrogen not found by spectral analyses. The effect of irradiation on the oxidant and nitrogen dioxide concentrations of night air was demonstrated. Irradiation produced a significant increase of nitrogen dioxide, but not enough to account for all oxidant formed. Thus, experimental observations relating to formation of oxidant can be explained on the assumption that ozone is formed by photolysis of nitrogen dioxide, aided by a rapid conversion of nitric oxide to nitrogen dioxide in the presence of certain hydrocarbons. Quantitative aspects of such systems are under investigation." (Quoted in part).

407

Liu, Vi-Cheng. 1956
TURBULENT DISPERSION OF DYNAMIC PARTICLES. Jour. Meteorol., v. 13, Aug. 1956: 399-405. DLC (QC851.A283, v. 13)

A discussion is presented of turbulent dispersion of particles whose size and inertia are such that it cannot be assumed that they will follow exactly the fluctuations of the fluid elements with which they are associated. The turbulent field is assumed to be stationary, homogeneous, and isotropic. Stationary, extraneous force fields for the particles may exist. The method of generalized harmonic analysis (Wiener) is used to determine the statistical particle-dispersion parameters in terms of the spectrum density of the turbulent field, and the physical characteristics of the particles. The discussion is restricted to 1-dimensional problems; it includes consideration of the relation between turbulent dispersion and Brownian motion of the particles owing to molecular impacts. An illustrative example of dispersion calculation with a given turbulence spectrum is presented, and aspects of practical applications are discussed briefly. (Author's abstract)

408

Lodge, J. P., Jr. 1954
ANALYSIS OF MICRON-SIZED PARTICLES. Analyt. Chem., v. 26, Nov. 1954: 1829-1831. (Paper presented at the 124th Meeting of the American Chemical Society, Chicago, Ill.) DLC (TP1.I615, v. 26)

Procedures and illustrations are given for the use of Millipore gelatin, sensitized with specific reagents, in spot tests to identify ammonium, calcium, and magnesium ions, and halides, sulfates, and nitrates. The technique is considered suitable for the identification of atmospheric particulate matter (size range from 10^{-6} to below 10^{-13} g). Information on the particle concentration can be obtained from filtration of a known volume of air.

409

Lodge, J. P., Jr. 1954
and H. M. Fanzoi.
EXTENSION OF THE GELATIN METHOD FOR THE DETECTION OF MICRON-SIZED PARTICLES. Analyt. Chem., v. 26, Nov. 1954: 1829. DLC (TP1.I615, v. 26)

The experimental procedures for the determination of calcium, sulfate, and nitrate ions in airborne fine particles are given.

410

Lodge, J. P., Jr. 1956
and B. Tufts.
TECHNIQUES FOR THE CHEMICAL IDENTIFICATIONS OF MICRON AND SUBMICRON PARTICLES. Tellus, v. 8, May 1956: 184-190. DLC (QC801.T4, v. 8)

Chemical methods are presented for routine identification and size estimation of water- or acid-soluble particles of a number of chemical species, using spot test techniques and light or electron microscopy. Although the work reported here is primarily that of the authors and their coworkers, a brief literature survey of work in other laboratories is included.

411

1953
LOS ANGELES SAFEGUARDS UNDERPASS AIR PURITY. Amer. City, v. 68, June 1953: 96-97. DLC (HT101.A5, v. 68)

Continuously sampling carbon monoxide detectors in the underpass beneath Los Angeles International Airport will: (1) regulate aerating fans; (2) signal when air contamination reaches a safety limit; and (3) halt traffic entering the underpass when contamination becomes unsafe. The detector consists of a catalyst and thermocouple cell, called a hopcalite unit, and a graphic recording potentiometer. A fan house at each end of the subway contains 2 analyzers, 2 exhaust-, and 2 supply-fans. Fresh air ducts beneath the divided roadway between the 2 fan houses supply air through vents. Similar exhaust ducts with intake slits run along the underpass wall. Contaminated air is discharged through roof stacks at the fan houses. Exhaust and supply fans are regulated so that the rate of supply is proportional to the rate of exhaust. Air samplers are located in wall-recesses, 3 at either end of the underpass.

412

1953

LUNG CANCER INCREASE. Sci. News Letter, v. 64, Nov. 14, 1953: 311. DCU

Dr. P. Kotin of the University of Southern California reported to the American Cancer Society in New York that aliphatic hydrocarbons and their oxidation products are capable of producing skin tumors in mice. These hydrocarbons in air are derived from the combustion of gasoline, diesel oil, natural gas, and coal. The greater incidence of skin tumors in big cities as compared to rural areas was noted.

413

McCabe, L. C. 1952
ATMOSPHERIC POLLUTION: MULTIPLE-CHAMBER WOOD-BURNING INCINERATORS: Indus. and Eng. Chem., v. 44, Apr. 1952: 111A-114A, illus. DLC (TP1.I6, v. 44)

Incomplete combustion, resulting from an imperfect relationship among time, temperature, and turbulence in the furnace, produces smoke, eye irritants, and particulate matter, the common ingredients of smog. For better control of these combustion relationships, multiple-chambered incinerators, as pictured, are suggested, and their principles of design discussed.

414

McCabe, L. C. 1952
ATMOSPHERIC POLLUTION: EQUIPMENT TO CONTROL GASES FROM GRAY IRON FOUNDRIES. Indus. and Eng. Chem., v. 44, June 1952: 103A-106A. DLC (TP1.I6, v. 44)

Stack gases from coke and cast iron industries contain up to 0.013% sulfur dioxide and 1.6 grains/cu ft of particulate matter. It was shown that 2 or more types of equipment were necessary to control the amount of pollutants discharged to the air. In one plant a settling chamber was used to remove 50% of the particulate matter, followed by wet scrubbers or packed towers, and finally bag filters or electrical precipitators for removing the remaining particulate matter below 10 microns.

415

McCabe, L. C. 1952
ATMOSPHERIC POLLUTION. Indus. and Eng. Chem., v. 44, July 1952: 89A-92A. DLC (TP1.I6, v. 44)

Samplers and automatic recording devices have been developed to measure: (1) sulfur dioxide; (2) oxidizing power of the atmosphere; (3) hydrogen sulfide; (4) atmospheric carbon dioxide; (5) dustfall; and (6) aerosol concentrations. Ozone in smog has been measured as high as 20 ppm by volume, and dust particles ranged from 10^{-5} to 10^{-3} cm in diameter. Analysis of exhaust products from automobiles indicated that 600 tons of hydrocarbons are emitted each day in Los Angeles County, Calif. The oxidants of smog produce a water-logged appearance on leaves which under microscopic examination reveals tiny blisters.

416

McCabe, L. C. 1952
ATMOSPHERIC POLLUTION: REPORT ON SCRUBBING DEVICES FOR AIR POLLUTION CONTROL. Indus. and Eng. Chem., v. 44, Aug. 1952: 105A-107A, illus. DLC (TP1.I6, v. 44)

A fog-filter unit is illustrated and described. Using a 3% soda ash scrubbing medium, an airflow rate of 1000 cu ft/min, and a spray rate of 20 gal min, sulfur dioxide concentrations were reduced from 10,000 ppm to 1 ppm, and hydrogen sulfide from 2200 ppm to 200 ppm. An 8% soda ash solution was required for complete removal of hydrogen sulfide. Equipment to reduce the fumes from an asphalt-oxidizing plant is also pictured.

417

McCabe, L. C. 1952
ATMOSPHERIC POLLUTION: ELECTROLYTIC REFINING OF MAGNESIUM. Indus. and Eng. Chem., v. 44, Oct. 1952: 123A-126A DLC (TP1.I6, v. 44)

Some of the recommendations made to reduce the amount of pollutants discharged during magnesium refining follow: (1) louvers should be cleaned when the atmospheric conditions are better able to disperse the additional pollutants, e.g., during the middle part of the day; (2) the openings at the anodes and the spaces between them should be kept at a minimum during cleaning operations; (3) the suction in the cells should not become lower than 0.04 in. of water; and (4) the fans should be used continuously to dilute the gases entering the ventilating stacks.

418

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: CATALYTIC COMBUSTION OF ODOR-PRODUCING AGENTS. Indus. and Eng. Chem., v. 45, Mar. 1953: 109A-112A, illus. DLC (TP1.I6, v. 45)

A platinum alloy-alumina catalytic unit was developed for installation in plant stacks to burn the organic vapors present in exhaust gases. The unit, operating at 400°F, is expected to supply about 5000 hr of service before reactivation of the catalyst. The hot gases are recirculated through the oven, a diagram of which is given, and the excess cleaned gases are discharged from the stack. Tables are given for the heat requirements in the oven, the effect of recycling oven gases, and the decreased city-gas requirements when recycled gas is used.

419

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: METEOROLOGICAL FACTORS PLAY MAJOR ROLE IN AIR POLLUTION. Indus. and Eng. Chem., v. 45, July 1953: 106A-109A. DLC (TP1.I6, v. 45)

Since meteorological factors play an important part in air pollution, instruments developed by various companies to record wind velocity and direction are described. A forward-scattering photometer is used to measure dust concentration by the light scattering from aerosols. Another meter for measuring and recording visibility is described.

420

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: USEFULNESS OF NEW INSTRUMENTS FOR DETERMINING AIR POLLUTANTS. Indus. and Eng. Chem., v. 45, Aug. 1953: 105A-108A. DLC(TP1.I6, v. 45)

Several new instruments and methods for determining air pollutants are discussed. A table of the general properties of air sampling media is presented. Methods of studying the atmosphere include: (1) analysis of aerosol contaminants; (2) recording light transmission in the air; (3) analysis of gaseous contaminants; and (4) study of meteorological factors. An analyzer has been developed to detect trace quantities of fluorides which quench the fluorescence of metal oxinates under ultraviolet light. The oxidants present in smog are detected by measuring the light transmission of iodine liberated from potassium iodine solutions.

421

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: OXIDATION OF PHENOLPHTHALIN TO PHENOLPHTHALEIN PROVIDES MEANS FOR ESTIMATING OXIDANT IN THE AIR. Indus. and Eng. Chem., v. 45, Sept. 1953: 111A-113A. DLC (TP1.I6, v. 45)

A colorimetric method, based on the oxidation of phenolphthalin, was developed for measuring the total oxidants of the air as hydrogen peroxide. Air is passed through 10 ml of the test reagent (dilute phenolphthalin and copper sulfate) at 800 ml/min for 10 min. The color is read against a green filter in a Klett-Summerson colorimeter, and corrected by a reagent blank. A standard curve is given showing typical colorimetric readings against various hydrogen peroxide concentrations. Typical curves for this method are also graphed. Tests have shown that at total oxidant concentrations of 0.13 ppm smog odor is detected, and at 0.26 ppm eye irritation is felt.

422

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: METHODS AND INSTRUMENTS FOR MEASURING ATMOSPHERIC POLLUTION. Indus. and Eng. Chem., v. 45, Oct. 1953: 109A-110A. DLC (TP1.I6, v. 45)

A concept for zoning based on the ability of industry to control objectionable contamination in the form of smoke, dust, and gases is discussed. A summary of analytical methods and equipment applicable to determining air pollutants is tabulated.

423

McCabe, L. C. 1953
ATMOSPHERIC POLLUTION: TUBULAR TYPE CYCLONES ARE THE MOST EFFICIENT DUST COLLECTORS. Indus. and Eng. Chem., v. 45, Dec. 1953: 105A-108A. DLC (TP1.I6, v. 45)

Four types of dust collectors for coal burning installations are: (1) cinder traps; (2) low-draft-loss collectors; (3) medium-draft-loss collectors; and (4) high-draft-loss collectors. The cinder trap has an efficiency of only 20-30%, removing particles larger than 200 microns. Of the 3 types of high-draft-loss collectors, namely, the large cyclone, the small cyclone, and the tubular collector, the latter has a high efficiency of 95% and removes particles of 5-micron size. Three of the collectors are illustrated, and comparisons are tabulated.

424

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: SMOKESCOPE; TOXICITY OF SULFUR DIOXIDE. Indus. and Eng. Chem., v. 46, Feb. 1954: 95A-98A. DLC (TP1.I6, v. 46)

A smoke comparator operating on the principles of the Nyder gunsight has been developed by the Mine Safety Appliances Co. as an improvement over the Ringelmann chart. A cross section of the smokescope is illustrated, and its design features are discussed. In successful field tests, smoke densities comparable to Ringelmann no. 1, 2, and 3 were measured; however, the present model measures only no. 2 and 3 colors, which is the area of questionable smoke concentration. The results of the exposure of various animals to concentrations of sulfur dioxide ranging from 10-50 ppm over varied periods are tabulated. Vegetation was destroyed after exposure for 24 hours at 6.6 ppm of sulfur dioxide.

425

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: THE ARMY CHEMICAL CORPS PUBLISHES ITS THIRD SYMPOSIUM ON AEROSOLS. Indus. and Eng. Chem., v. 46, Apr. 1954: 99A-102A. DLC (TP1.I6, v. 46)

A review of 8 papers comprising the report of the US Army Chemical Corps on aerosols is given. Several methods of producing condensation nuclei are discussed, one of which, the silver iodide smoke generated in a charcoal-burning technique, is diagrammed. The brightness and color of smoke is the ratio of total scattering and adsorption cross-section against the scattering cross-section. The toxicity of an atmosphere can be determined by noting the survival time of animals in that atmosphere. The behavior of smoke plumes have been studied in wind tunnels built at New York Univ. Light scattering techniques have been used to measure particle sizes as small as 0.1 micron.

426

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: A NEW THERMAL PRECIPITATOR; PERFORMANCE OF FABRIC DUST COLLECTORS. Indus. and Eng. Chem., v. 46, June 1954: 105A-107A, illus.
DLC (TP1.I6, v. 46)

A new thermal precipitator having 3 main parts is pictured, and its operation described. Electron-microscopic examination of all kinds of airborne particles is possible by inserting several electron-microscope screens. Three types of fabric dust collectors described are: (1) cloth tube, cleaned by mechanical shaking; (2) reverse air-jet collector; and (3) cloth tube, cleaned by mechanical rapping and backflow air. The efficiency of the collector depends on the type of fabric and the layer of dust. Immediately following cleaning, the efficiency decreases, gradually increasing as the dust layer accumulates.

427

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: PROBLEMS OF DEFINING AND CONTROLLING UNDESIRABLE ODORS. Indus. and Eng. Chem., v. 46, Aug. 1954: 87A-88A. DLC (TP1.I6, v. 46)

A mixing unit method of determining mixtures of odors in contaminated air is diagrammed, and a suggested odor chart is shown. Odors in the air can be controlled by combustion in direct-fired air heaters, by adsorption on activated carbon, by adsorption in liquids, and by the use of odor modifiers.

428

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: STANFORD RESEARCH INSTITUTE REPORTS ON LOS ANGELES SMOG. Indus. and Eng. Chem., v. 46, Oct. 1954: 103A-106A. DLC (TP1.I6, v. 46)

The 2-part report is concerned with the discussion of a 7-yr study of the smog problem, and an investigation of ozone in the atmosphere, the chemical reactions which take place in the air, and the damages caused by smog. It is reported that ozone is formed by the reaction of sunlight on hydrocarbons and oxides of nitrogen, and that the diffusion of this pollutant is attributed to meteorological factors existing in the area. Crop damage, owing in part to the presence of ozone as low as 12 pphm, is estimated to be above $1,000,000 yearly in the Los Angeles, Calif. area. The hydrocarbon content of the air in localities of heavy motor-vehicular traffic was measured as 0.2 ppm on clear days, and 1.1 ppm on days of severe smog.

429

McCabe, L. C. 1954
ATMOSPHERIC POLLUTION: DAMAGE TO LEAFY VEGETABLES BY SMOG IN THE LOS ANGELES BASIN IS ESTIMATED AT $500,000 PER YEAR. Indus. and Eng. Chem., v. 46, Dec. 1954: 93A-94A. DLC (TP1.I6, v. 46)

Organic acids in the Los Angeles, Calif. air were measured at 0.6-0.7 ppm by volume. The concentration of formic acid in the air was measured by a standard comparison of the colored complex of formaldehyde, formed by the reduction of formic acid, and chromotropic acid. Damage to vegetation, similar to that which causes about $500,000 annual losses, is produced by the reaction of ozone with hydrocarbons and auto exhausts. Graphs of the chromatographic separation of organic acid components of the air are given. A table of daily concentrations of formic acid in downtown Los Angeles is presented.

430

McCabe, L. C. 1956
ATMOSPHERIC POLLUTION: NITROGEN OXIDES RECORDER, OZONE RADIOMETER, AND SMOG METER. Indus. and Eng. Chem., v. 48, Feb. 1956: 91A-92A. DLC (TP1.I6, v. 48)

Among the new instruments developed by Borman Engineering, Inc. are a nitrogen oxide recorder, an ozone radiometer, smog meter, a concentrometer, and a carburetor idle shutoff. The nitrogen oxide recorder consists of a scrubbing tower in which nitrogen oxide and organic nitrites are absorbed with Saltzman's reagent to form a characteristic color, a photoelectric photometer to measure the resulting color, and a strip chart to record the nitrogen oxide concentrations. The ozone radiometer is comprised of an ultraviolet projector, and a receiver which measures the radiation from ozone and other attenuants at 265 millimicrons and only the attenuants at 302 millimicrons. The difference between the 2 readings is the ozone concentration. The instruments have an accuracy of 1 pphm, and have measured ozone up to 52 pphm, NO to 17 pphm, and NO_2 to 26 pphm.

431

McCabe, L. C. 1956
ATMOSPHERIC POLLUTION. RINGELMANN CHART MEASURES DENSITY OF BLACK SMOKE, BUT WHITE AND COLORED SMOKES OFFER DIFFICULTIES. Ind. and Eng. Chem., v. 48, Apr. 1956: 99A-101A. DA

This article reviews the use of the chart and quotes a portion of the Health and Safety Code of the State of California which refers to no. 2 on the Ringelmann Chart as a measure of air pollution. White-colored effluents are measured by the degree in which the smokes obscure what lies behind them. Sky background and presence of steam influence the apparent density of these effluents. Court cases in California in which it is claimed that the statute does not properly define limits of air pollution for colored smokes are mentioned.

432

McCabe, L. C. 1956
ATMOSPHERIC POLLUTION: MEASUREMENT OF TRACE QUANTITIES. Indus. and Eng. Chem., v. 48, June 1956: 96A-98A, illus.
DLC (TP1.I6, v. 48)

A continuous oxidant recorder for trace quantities of gases or vapors in air or other gases is illustrated and described. The color formed between the reagent and the sample, each metered countercurrently into the contactor, is measured in a colorimeter, and recorded as a measure of the gas concentration. Other measurements are made by electrical conductivity.

433

McCornack, A. A., 1952
and others.
A BLACK TIP CONDITION ON PEACH FRUITS IN CALIFORNIA. Plant Disease Reporter, v. 36, Mar. 15, 1952: 99-100, illus. DA

Evidence indicates that a condition of peach fruit, in the Cucamonga area of Calif., known as black tip was not caused by an infectious agent or by any changes in cultivation methods, but rather by some factor new to the area such as air pollution. The affected area lies within 4 to 12 miles of a steel plant, located near Fontana, Calif. Overhead irrigation, which probably washed off the contamination, may be the reason why one orchard reported considerably less injury. Apricots grown in the same area, have shown instances of leaf scorch typical of that for fluoride injury. Investigations are now underway to determine by chemical analysis whether fluorine is the cause of black tip.

434

McDevitt, F. J. 1956
ST. LOUIS TURNS TO INCINERATION. Amer. City, v. 71, July 1956: 124-126.
DLC (HT101.A5, v. 71)

Led by the problem of eliminating smoke from domestic incinerators, St. Louis, Mo. set into operation a municipal incinerator designed to burn over 400 tons of refuse a day. Air passing through the 6-in. space between the firebrick wall and the exterior furnace wall is heated and used in the furnace as preheated over-fire air. Gas velocities are reduced to 7.5 ft/sec in the expansion chamber to allow fly ash to settle out before the gas is discharged through the 175-ft stacks. Fly ash is removed by a hydraulic vacuum system to a sewer which carries it to the Mississippi River.

435

Macdonald, A. 1956
LEGAL ASPECTS OF AIR POLLUTION CONTROL. Indus. Wastes, v. 1, Jan.-Feb. 1956: 91-94. (Paper presented at the National Air Pollution Symposium, Pasadena, Calif., Apr. 1955)
DLC

Air pollution officials do not have unlimited legal power to require the indiscriminate removal of all air-polluting contaminants although the public may believe that they do. Great emphasis should be placed on the importance of the effect of public opinion on the administration of air pollution legislation. It is stated that "the most workable method of air pollution control is one which not only permits, but requires, a maximum of individual initiative and a minimum of interference by the government." The local community should attempt to solve its problems of air pollution with the aid of private industry. It is suggested that a voluntary, nonprofit, self-governing association -- with membership open to any individual or industry in the area -- be created to sponsor a private code of regulations and standards for the control of air pollution. These private codes may then be made into laws by enacting the code into a city or county ordinance (as was done successfully in Allegheny County, Pa.), or by adopting the code by reference.

436

MacDonald, I. 1955
ENVIRONMENTAL FACTORS OF OCCUPATIONAL ORIGIN RELATED TO CARCINOGENESIS. Jour. Amer. Med. Assoc., v. 157, Jan. 1, 1955: 5-7. DLC (R15.A48, v. 157)

Carcinogenic substances incidental to industrial procedures represent a hazard both to those occupationally exposed and to the population in general. The potential carcinogenic materials may be classified on the basis of their nature, their environmental site, and the target tissues responding to them. Their natural state may be chemical, physical, or biological. Their environmental site may be in the atmosphere, in the soil, or in the water. The tissues responding to them may be at the site of initial contact or in organs or organ systems concerned with their metabolic and eliminative processes. The control of these environmental factors seems entirely practical on the basis of current industrial hygiene and toxicologic practices. An awareness on the part of industrial physicians is the necessary starting point for protection of those environmentally exposed. (Author's abstract)

437

McLaughlin, A. I. G. 1955
THE DUST DISEASES IN GREAT BRITAIN.
Arch. Indus. Health, v. 12, July 1955: 83-98.
DLC (RC963. A14, v. 12)

The various, more commonly-occurring, dust diseases, such as those caused by silica, asbestos, and coal, are discussed in detail. Some of the ones occurring less commonly are mentioned, including Farmers' Lung and a pneumoconiosis in grain dockers. Farmers' or Threshers' Lung, which has features similar to bagassosis, has been found to occur during a wet summer when hay was moldy and may be caused by a fungus instead of by dust. A group of grain dock workers were shown to have some abnormal findings on x-ray examination; an analysis of the dusts from various grains showed small percentages of free silica, oat dust having 5%.

438

MacPhee, R. D. 1954
USE OF MOLYBDATES FOR ESTIMATING AMOUNT OF OLEFINIC-TYPE HYDROCARBONS IN AIR. Analyt. Chem., v. 26, Jan. 1954: 221-225, illus. DLC (TP1.1615, v. 26)

The estimation of micro quantities of olefinic hydrocarbons is important in studies of atmospheric pollution, as these hydrocarbons oxidize under proper conditions in the air, giving compounds that can cause crop damage, eye irritation, and reduced visibility. The gradual color change from yellow to green accompanying reduction of complex and simple molybdates in acid media has been used by others for measuring the amount of carbon monoxide in air. The same color change can be produced in molybdates by olefins and forms the basis for a method of measuring the approximate amount of C_3 and heavier olefinic hydrocarbons in the air. (Author's abstract)

439

Magill, P. L., 1952
and R. W. Benoliel.
AIR POLLUTION IN LOS ANGELES COUNTY.
Indus. and Eng. Chem., v. 44, June 1952: 1347-1351, illus. DLC (TP1.I6, v. 44)

In the Los Angeles area, reduced visibility is attributed to particulate matter and eye irritation to gaseous contaminants. Tabular data are given for the combustion products from the following sources: (1) power plants and heating operations using fuel gas and fuel oil; (2) automobile exhausts; (3) domestic incinerators; (4) industrial wood waste incinerators; and (5) municipal incinerators. Of the total pollutants, 70% are organic compounds, 15% nitrogen oxides, and 15% sulfur dioxide. Diagrams of sampling and testing equipment are illustrated.

440

Magruder, P. S. 1956
WHAT THE OIL INDUSTRY IS DOING TO REDUCE THE SMOG PROBLEM. Indus. Wastes, v. 1, Mar.-Apr. 1956: 140-144, illus. DLC

In 1947 the oil industry was declared to be the "principal contributor to Los Angeles smog." As a result, a comprehensive research program was undertaken into the causes of smog in the Los Angeles (Calif.) area and its control. Currently the oil industry states that not only is the contribution of its refineries to the smog problem a minor one, but that it is becoming less daily. Rule 56 governing the storage of gasoline was the only rule, until Sept. 1955, made by the Air Pollution Control District (Calif.) to govern emissions of hydrocarbons. In compliance with this regulation, numerous vapor recovery installations were made and floating roof tanks were installed. In addition, waste-water separators were covered; losses from pump glands were eliminated by installation of pressurized packing glands; vacuum jet effluents were controlled; and a program was instituted to eliminate the loss of gasoline which occurred during tank-truck loadings. It is estimated that these efforts resulted in conservation of approximately 200 tons of hydrocarbons. At present a large scale study is being carried out to determine the quantity and the possible role of other emissions from the oil industry. Repeated sampling of the atmosphere around the large refineries has shown no excessive quantities of sulfur dioxide, hydrocarbons, or particulate matter; wind studies have indicated that air from refinery areas rarely is carried into downtown Los Angeles or into that section having the heaviest smog concentrations.

441

Majer, J. R., 1955
INSTRUMENTAL PARTICLE SIZE ANALYSIS.
Chem. Age, v. 72, June 25, 1955: 1427-1434.
DLC (TP1. C33, v. 72)

Studies of inhaled air pollutants have prompted more extensive research in methods of determining particle size. Particles above 10 microns in diameter are deposited in the upper respiratory tract, while smaller particles, down to 0.3 micron in diameter, penetrate the lungs, and are deposited in the alveoli. Two fundamental methods of determining particle size are a gross effect measurement, and an individual examination of the particles. In the former method, particle sizes are analyzed by the rate at which they descend through a column or by the opacity of a suspension. Particles can be deposited on a microscopic slide by thermal precipitation for counting and sizing in comparison with standard graticules. Two instruments have been developed for scanning these microscopic slides. The first, using a moving spot of light and stationary slide, can count particles as small as 0.25 mm in diameter; while the second, with a fixed optical system and moving slide, distinguishes particles 0.8 micron in diameter.

442

Mallette, F. S., editor. 1955
PROBLEMS AND CONTROL OF AIR POLLUTION. (Proceedings of the First International Congress on Air Pollution held in New York City, Mar. 1-2, 1955 under the sponsorship of the Committee on Air-Pollution Controls of The Amer. Soc. of Mech. Engineers) New York, Reinhold, 1955, 272p. DLC (TD883.I5, 1955)

The topics discussed in the 25 papers presented at the Congress include: the growth of public opinion against air pollution in England and a background review of the "Beaver" report; a discussion of the public relations aspects of air pollution; gaps in the available biological, meteorological, and health knowledge on air pollution; current developments in air pollution; sulfur dioxide treatment and recovery; and experience in air pollution in Europe.

443

1953
MANCHESTER JUNIORS INSPECT GAS PURIFICATION PLANT. Gas World, v. 137, May 2, 1953: 1188. DLC (TP700.G2, v. 137)

The Birchenwood Coal and Gas Co. uses the Manchester process to remove hydrogen sulfide from town gas, cleaning 3 million cu ft of gas/day to 99.85% purity. The chemical reactions involved in the process are given. Various parts of the plant are described.

444

Marble, G. E. 1955
DESIGN FOR SUCCESSFUL COMMERCIAL INCINERATION. Gas Age, v. 115, Jan. 27, 1955: 19-22, 51-52. DLC (TP700.G14, v. 115)

The use of incineration has increased recently because of the overall economy of operation, the resulting improved sanitation, and the wide field of application. Various factors in design and operation are considered in view of the temperature, time, and turbulence necessary for efficient incineration. Theoretical potential gas loads are figured for the principal applications of incineration, and case histories are reviewed for various installations.

445

Marsh, A. 1955
SMOKE AND THE LAW. Gas World, v. 141, Apr. 16, 1955: 1007-1009. DLC (TP700.G2, v. 141)

A history is given of legislation in the United Kingdom to prevent or control air pollution. The shortcomings and defects of past and present laws are discussed, and some aspects and opinions of a future bill are presented. Some provisions proposed for future legislation are: (1) smoke must not exceed the no. 2 Ringelmann color, except that single bursts of darker smoke must not exceed a 2- or 3-min duration; (2) grit arrestors must be installed to minimize the emission of dust and similar particles; (3) new installations must be inspected before they are placed in operation; and (4) domestic smoke must be controlled.

446

Marshall, T., 1955
and R. M. Sinclair.
CORROSION OF MATERIALS SUBJECTED TO LOCOMOTIVE SMOKE AND FUNNEL BLAST. Corrosion, v. 11, Sept. 1955: 379t-382t. DLC (TA462.C65, v. 11)

Smoke in sheds housing coal-burning locomotives is removed through stacks built at intervals by means of U-shaped ducts placed over the locomotives. Materials and coating for these ducts and stacks were tested for their corrosion resistance. The test panels, exposed for 0.7 to 3 yr. were 0.030 - 0.068 in. thick. An analysis of the test results is tabulated for unprotected surfaces as well as the coated surfaces. The tests indicated that vitreous enamelled steel and double-coated enamelling provided the best resistance to corrosion.

447

Martin, R. 1955
SIMPLE CALCULATOR FOR NATURAL DRAUGHT OF CHIMNEYS. Eng. and Boiler House Rev., v. 70, Apr. 1955: 132. DLC (TA1.F3, v. 70)

The French National Coal Board has distributed a disk composed of 2 circular scales from which the theoretical natural draft can be calculated if the chimney height and the temperatures of the chimney gases and external air are known. The calculator can be used to detect chimney leaks or to determine the proper height of a new chimney when the other factors are known.

448

Mateer, C. L. 1955
AVERAGE INSOLATION IN CANADA DURING CLOUDLESS DAYS. Canad. Jour. Tech., v. 33, Jan. 1955: 12-32. DLC (T1.C23, v. 33)

Insolation is defined as "the incoming solar radiation incident on a horizontal surface," including both direct solar and diffuse sky radiation. Insolation charts for measurements made during each month of the year indicate that fluctuations occur, on the whole, in areas of atmospheric pollution such as industrial communities.

449

Mateson, J. F. 1955
OLFACTOMETRY: ITS TECHNIQUES AND APPARATUS. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 167-170, illus. (Paper presented at the 48th Annual Meeting of the Air Pollution Control Association at Detroit, Mich., May 22-26, 1955) DLC

A short review and classification of odor measurement devices are presented to show that the odor field does not possess standard odor-measuring apparatus. Since the olfactometers and osmometers of today vary in their working principles, and because each unit usually presents its own novel expressions of odor concentrations, correlation of reported odor thresholds are indicative of trends only. The significance of these trends can only be judged on the basis of standard deviations. New types of odor-measurement devices, presently being developed, are described. Factors affecting organoleptic odor determinations were outlined in the hope that they will aid those interested in the apparatus and techniques of this field. In speaking of odors, the variables of chemistry, physiology, physics, and psychology are immediately introduced. It is easy to forget the psychological aspects of odors, or even more easy to assume that they are nonexistent. (Author's abstract in part)

450

Mauclet, R. 1952
[STUDY ON THE TOXICITY OF FUEL USED IN THE MOTORS OF JET PLANES: CUTANEOUS SENSITIVITY OF CERTAIN SUBJECTS TO KEROSENE] Étude sur la toxicité des carburants employés pour les moteurs des avions à réaction: sensibilité cutanée de certains sujets au kérosène. Ann. belg. méd. militaire, v. 105(9/10), 1952: 162-164. DNLM

Mechanics handling jet fuel are subject to 2 kinds of poisoning: skin poisoning by absorbed fuel and poisoning by inhalation of fuel vapors. Symptoms of acute kerosene poisoning are headache, defective vision, mental confusion, fatigue and often nausea, abdominal pain, and loss of consciousness. In certain cases, convulsive seizures occur just as in epilepsy. Chronic poisoning is harder to diagnose; the most frequent symptoms are loss of weight, increased pulse rate, severe secondary anemia, diarrhea, mental confusion, and skin irritation. Rubberized clothing, and rubber boots and gloves give the best protection against kerosene poisoning.

451

Mavrodineanu, R., 1955
and R. R. Coe.
IMPROVED APPARATUS AND PROCEDURES FOR SAMPLING AND ANALYZING AIR FOR FLUORIDES. Contr. Boyce Thompson Inst., v. 18, Apr-June 1955: 173-180, illus. DLC (QK1.B865, v. 18)

Apparatus and procedures are described for sampling and analyzing air contaminated with silicon fluoride and hydrogen fluoride at concentrations from 1 to several 100 ppb. The air is drawn into a conical absorber, containing 50 ml of fluorine-free water, at 10 to 84 cu ft/hr; a 95% recovery is obtained. A smaller absorber containing 40 ml of absorbing liquid is equally efficient for air speeds of 40 cu ft/hr. An automatic time clock sampler is also described.

452

May, K. R., 1953
and H. A. Druett.
THE PRE-IMPINGER; A SELECTIVE AEROSOL SAMPLER. Brit. Jour. Indus. Med., v. 10, July 1953: 142-151, illus. DLC (RC963.A23, v. 10)

A simple device is described which, when fitted to the front of an impinger, divides the total aerosol sample into 2 particle-size fractions by means of size-selective impingement into liquid. The cutoff between the 2 fractions is set at 4 microns to simulate nasal penetration. The curve of efficiency of impingement of particles into the liquid against particle size shows that the pre-impinger has a very high efficiency in relation to its jet velocity. This is due to a double impingement process on the liquid surface. The particle intake efficiency at various wind speeds is given in detail, and is shown to be good for particles smaller than 30 microns. Empirical equations are given to show the relation between cutoff size, intake hole diameter, and jet velocity so that the cutoff may be set to any other desired figure in the range 2.5 microns to 8 microns. Internal losses were evaluated and shown to be small. Streamlines of flow into and around the device were investigated by means of smoke filaments in a wind tunnel. It is concluded that the particle retention of the pre-impinger is similar to that of the nasal passages, while the material in the backing impinger is similar to that reaching the lungs. The pre-impinger appears to have some important advantages over other devices for selective sampling such as dry impaction systems, and settling chambers. (Authors' abstract)

453

May, K. R. 1956
A CASCADE IMPACTOR WITH MOVING SLIDES. Arch. Indus. Health, v. 13, May 1956: 481-488, illus. DLC (RC963.A14, v. 13)

A moving-slide impactor for sampling airborne material was designed so that 4 sampling slides pass mechanically across the air jets simultaneously. The performance of this instrument has been found to be very satisfactory with respect to size separation and freedom from internal loss.

454

May, M. L. 1956
AIR POLLUTION CONTROL. Instruments and Automation, v. 29, May 1956: 908-909, illus. DLC (TA165.A2, v. 29)

Techniques and equipment used at the Midland Plant of Crucible Steel for the measurement and control of air pollution are described briefly. They include: analysis by photoelectric methods of blast-furnace-gas dust loading; a filter paper method for evaluation of atmospheric contamination; a similar method for evaluation of hydrogen sulfide in the atmosphere; smoke recorders; and instruments for recording wind direction and velocity.

455

1954

MEASURING DUST IN BLAST FURNACE GAS (BISRA PHOTOELECTRIC METER NOW IN PRODUCTION). Brit. Steelmaker, v. 20, Mar. 1954: 114, illus. DLC (TN704. G7375, v. 20)

A continuously recording photoelectric meter for measuring the dust content of blast furnace gases has been put into production by the British Iron and Steel Research Association (BISRA). The component parts of the instrument are: (1) a sampling unit with photoelectric cells, the light source, and an optical system; (2) a thermionic valve amplifier, together with its stabilizer, power supplies, and controls; (3) a 7-in. diameter indicator-relay meter, incorporating a small contactor for connection to an alarm system; and (4) a continuous 3.5-in. wide strip recorded. The equipment has undergone extensive trials under the guidance of BISRA, and the test results are consistent with those obtained by gravimetric methods.

456

1954

MEASURING SMOKE AND SULPHUR. Gas World, v. 140, Dec. 18, 1954: 1534. DLC (TP700. G2, v. 140)

Daily measurements of the smoke and sulfur dioxide in the London air are made at the Science Museum. Smoke drawn in by an electric pump is collected on filter paper, the color of the stain indicating the intensity of pollution. The air is also passed through a hydrogen peroxide solution to form an acid solution with the sulfur dioxide which is measured by chemical means.

457

Meldau, R., 1956
and D. Laufhutte.

[THE INFLUENCE OF ADDITION OF OXYGEN TO THE BLAST ON DUST PARTICLE COMPOSITION OF A THOMAS CONVERTER AND ON FURNACE WASTE GASES IN THE ARC FURNACE] Der Einfluss der Sauerstoffzusatzes zum Gebläsewind auf die Kornzusammensetzung der Thomaskonverter und Ofenabgase beim Lichtbogenofen. Arch. für Eisenhüttenwesen, v. 27, Mar. 1956: 149-152, illus. DLC (TS300. A85, v. 27)

The influence of oxygen enrichment of the blast on the dust particle composition of the waste gases from electric arc furnaces is discussed in detail. An instance in the literature is mentioned where oxygen enrichment of the blast resulted in waste gases with a composition of 97% iron oxide and 3% other oxides (including 0.4% SiO_2, 0.44% CaO, 0.19% MnO, and 1.90% P_2O_5.) Studies were made to determine the particle size, particle characteristics, and the quantity of "brown dust." Dust particles in the waste gases under various conditions of operation are shown in several photomicrographs.

458

1956

METEOROLOGICAL ASPECTS OF ATOMIC RADIATION. Science, v. 124, July 20, 1956: 105-112. (Summary rept. of the Committee on Meteorological Aspects of the Effects of Atomic Radiation, National Academy of Sciences) DLC (Q1. S35, v. 124)

In a short section on artificially introduced radioactive tracers (p. 111), the use of radioactive tracer material to further the knowledge of diffusion near the ground for air pollution studies is discussed. The radioactive tracer material which appears to be most promising for such studies is tritium, with tritiated methane, and tritium-marked water molecules being suggested for some uses.

459

Michaels, A. 1955

INCINERATOR AUTOMATION. Amer. City, v. 70, Oct. 1955: 130-131. DLC (HT101. A5, v. 70)

The Philadelphia, Pa. incinerator has reached a daily capacity of 1,950 tons of burned refuse using 15 monohearth furnaces. Many automatic devices have been installed in order to meet air-pollution controls. Fly ash is controlled through water spray chambers, and the temperature of the discharge gas is controlled below 600°F by a pyrometer located in the discharge flue. A smoke-indicating "eye," located in the stack, reads and records the density of the stack gases and signals when the density becomes too high. "For public relations reasons," wind-recording instruments are set up at the plant.

460

Michaels, A. 1956

DESIGN CRITERIA FOR MUNICIPAL INCINERATORS -- THE CUSTOMER'S VIEW. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 139-143, illus. (Excerpts from a paper presented at the American Society of Mechanical Engineers Semi-annual Meeting, Cleveland, Ohio, June 17-21, 1956) DLC

Many of the criteria which must be taken into consideration in the design of a municipal incinerator are discussed in detail. Among other things, the incinerator must be able to meet the air pollution control regulations of the area. Many such regulations base their limits of acceptable stack emissions upon boiler operations. For instance, many cities use stack emission limits of 0.85 lb/1000 lb of gases corrected to 12% carbon dioxide. Unlike a boiler, a municipal incinerator operates most efficiently with 100% or more excess air, resulting in stack carbon dioxide readings of between 3 and 6%. A more realistic definition of acceptable stack effluent from incinerators might include a relationship between tonnage incinerated on a dry basis and total weight of stack particulate matter. Nuisance factors, such as noise and odor, as well as the general aesthetic appearance of the plant, also have became factors in the design. (Quoted in part)

461

Middleton, J. T., 1953
J. B. Kendrick, Jr., and E. F. Darley.
OLEFINIC PEROXIDE INJURY TO BEAN AS INFLUENCED BY AGE, VARIETY, CHEMICAL ADDITIONS, AND TOXICANT DOSAGE. (Abstract). Phytopathol., v. 43, Oct. 1953: 588. (Paper presented at the 6th Annual Meeting of the Pacific Division of the American Phytopathological Society, Santa Barbara, Calif., June 17-19, 1953)
DA

The extent and severity of injury to the leaves of pinto beans, and other varieties of beans, were studied following experimental exposure to olefinic peroxides. Damage to the primary leaves of pinto bean plants increased as the age of the leaves increased from 2 to 16 days. No injury was apparent on the terminal, unexpanded leaves. Extent of injury at a given concentration of toxicant was found to be directly proportional to the duration of exposure. Varieties of Phaseolus lunatus and P. vulgaris respond differently to the toxicant. Golden Cluster, Pink, pinto (gray), Small White, and Fordhook 242 were found to be among the most susceptible, while Bountiful, pinto (brown), and Fordhook Concentrated were among the most resistant. Results with varied concentrations of 2 plant sprays, before exposure to the olefinic peroxides, suggest 2 mechanisms of action: direct chemical influence, and altered plant activity.

462

Middleton, J. T., 1953
J. B. Kendrick, Jr., and E. F. Darley.
AIR POLLUTION INJURY TO CROPS (INJURIOUS COMPONENTS OF SMOG IDENTIFIED AS DERIVATIVES OF PETROLEUM PRODUCTS WHILE ANNUAL CROP DAMAGE INCREASES) Calif. Agri., v. 7, Nov. 1953: 11-12. DA

Studies indicated that when susceptible plants were fumigated under controlled conditions with the vapors of more than 70 chemicals known or thought to be present in the polluted air of Los Angeles, Calif. injuries comparable to those seen in the field occurred only when plants were exposed to the reaction products of ozone and unsaturated hydrocarbons. These reaction products include olefinic peroxides, organic acids, and aldehydes, but only the peroxides caused typical plant damage. In Los Angeles alone, crop losses have exceeded $500,000 since 1948, at which time they were estimated at $479,495. Damage which originally was seen only in the southern part of the state now occurs in the San Francisco Bay area and other industrial and metropolitan centers in Calif. It was found that the severity of the plant damage to spinach, romaine, and endive from artificial smog (ozone and unsaturated hydrocarbons) was markedly greater when the plants were grown at an air temperature of 75°F than at 55°F; and also, in the case of spinach and romaine, when nitrogen was added to the soil. The extent of injury also depended upon the length of fumigation time, age of plant, and soil-moisture level. Varieties of a given crop responded differently to the airborne peroxides. Growth of plants may be materially retarded without visible symptoms of injury, especially in field crops where all plants are affected. Injury to susceptible crops is likely to be most severe when the plants are grown under glass, but protection can be achieved by passing all incoming air through activated charcoal filters.

463

Middleton, J. T., 1955
J. B. Kendrick, Jr., and E. F. Darley.
AIR POLLUTION DAMAGE TO AGRICULTURAL CROPS. Lasca Leaves, v. 5, Winter 1955: 6-11.
DA

The relative susceptibilities of a variety of plants known to be damaged by oxidized hydrocarbons in the atmosphere are presented in tabular form. Studies indicate that there is a definite suppression of plant growth; however, there is no information on the effect upon plant vigor and yield. Studies are currently being carried out to determine the effect of this growth suppression upon tree crops such as citrus and avocado. It was shown that well-watered plantings suffered more severely during periods of air pollution than did those not so well watered. The damage to crops was found to be directly proportional to the length of pollution period. Also the lower the inversion layer, the greater was the damage. Protection of plants under glass could be achieved by passing all air entering the greenhouse through activated carbon; protection of plants grown in the field has been achieved by applications of dithiocarbamates to the leaf surface. Research is being undertaken to decide the optimum quantity and periods of application of the chemical. Estimates of damage to agricultural crops in the Los Angeles, Calif. area alone, based on a survey in 1953, indicate that losses will exceed $3,000,000.

464

Middleton, J. T. 1956
RESPONSE OF PLANTS TO AIR POLLUTION. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 7-9, 50, illus. DLC

The effects of air pollution on vegetation are reviewed in general, and crop damage in the Los Angeles and San Francisco areas is discussed in particular. As a result of the mounting annual loss to the vegetable, field, vine, and citrus industries of California, a research activity was started recently to determine the effects of air pollution on plants, methods of plant protection, and the identity of the airborne phytotoxicants. Injury typical to that which occurs naturally is reproduced under controlled conditions by exposure of plants to the oxidation products of ozonated unsaturated hydrocarbons. Plants are exposed in outdoor fumigation chambers. Air introduced into the chambers passes through beds of activated carbon to remove all phytotoxic oxidants; controlled air temperature and humidity are maintained by recycling through conventional air conditioners. Ozone and hydrocarbons are first brought together in a glass reaction tube which is exhausted directly into the chamber; oxidant concentration is measured by determining the iodine released from potassium iodide buffered with Sorenson's reagent. Plants vary in their susceptibility to the reaction products from the oxidation of hydrocarbons. Among the more sensitive species are alfalfa, sugar beets, beans, celery, and spinach; some resistant plants are barley, cabbage, muskmelon, peas, and tomatoes. The pinto bean has been selected for most of the work since suitable experimental material can be produced from seed in about 2 weeks, and the leaves are extremely sensitive to damage. The atmosphere in Los Angeles and San Francisco allegedly has high concentrations of ozone, yet typical crop damage there is that reproduced only by ozonated olefins and not by ozone alone. Application of aqueous suspensions of a number of bisdithiocarbamates has been shown previously to prevent injury to leaf tissue resulting from exposure to natural air pollution as well as to oxidized hydrocarbons. Zinc ethylene bisdithiocarbamate was found to protect plants from reaction products of ozonated olefins as well as from ozone alone. Greenhouse-grown crops can be protected by passing the air through activated-carbon filters. The response of plants to oxidants is distinctly different from that attributable to fluorides, sulfur dioxide, and halogens. The specific symptoms incited by exposure to oxidants can be used to determine the presence of ozonated olefins and ozone in polluted air masses. This response provides an excellent bio-assay system for determining areas affected by pollution.

465

MILD APPROACH, BIG RESULTS. Chem. Week, v. 77, Apr. 28, 1956: 27. DLC (TP1.C37, v. 77) 1956

The lawsuit against 54 industrial plants, along the Houston Ship Channel, charging air pollution is discussed. Nearly all of the defendant companies have agreed to adopt pollution-abatement measures that are acceptable to the county health department; 51 of the 54 companies have submitted proposals for ending pollution. At some plants, corrections have been almost immediate, others may take up to 18 months. A table is given of the estimated cost of pollution-abatement measures being taken by 10 major chemical process plants; these costs range from $22,000 to $3,000,000.

466

Miller, S. E. 1955
REDUCED OVERRICHNESS CLAIMED WITH GASOLINE INJECTION SYSTEM. S.A.E. Trans., v. 63, 1955: 618. DBS

American Bosch reports that it has developed an injection system which reduces the idle fuel flow by 15%, and the deceleration fuel flow to 30% below the idle fuel rate. Use of this system would decrease the hydrocarbon pollution from automotive gasoline engine exhausts.

467

Miller, V. L., and others. 1953
LIME PAPERS AND INDICATOR PLANTS IN FLUORIDE AIR-POLLUTION INVESTIGATIONS. Jour. Agri. and Food Chem., v. 1, 1953: 526-529. DA

A search was made for an inexpensive method which could be used to detect atmospheric fluoride, and to define areas where this contaminant might be an economic factor with respect to farming. The use of the fluoride content of the leaves of the gladiolus as a plant indicator, and of lime-treated filter paper, is described as a method for estimating fluoride content of the air. This method is used especially to check the fluoride content of forage used for cattle.

468

Mills, C. A. [1952]
PUBLIC HEALTH ASPECTS OF AIR POLLUTION. In California. Legislature. Assembly. Interim Committee on Air and Water Pollution. Final Summary Rep., [Sacramento], Assembly of the State of California, [1952], p. 107-111. DLC (TD425.C315)

The long-term hazards of air pollution to community health and welfare are discussed. In 1943 a statistical survey of respiratory deaths in Cincinnati, Ohio and Pittsburgh, Pa. showed death rates for pneumonia, tuberculosis, and lung cancer to be sharply and significantly higher in the dirtier industrial areas of these 2 cities than in the cleaner residential suburbs. The higher incidence in the male is accounted for by his more frequent exposure to dirty air, and to greater use of tobacco. Doubts that poor housing conditions account for the higher incidence of pneumonia and tuberculosis in slum areas are raised by the fact that men were more often afflicted than women. It was also observed that there was a similar rise in buccal and respiratory tract cancer. Additional surveys have been completed in Chicago, Ill., Detroit, Mich., Nashville, Tenn., and Atlanta, Ga. Statistics from Chicago, where the larger population gives a more representative sample, indicate a rise in death rates from pneumonia and tuberculosis from clean to dirty districts which are ten times greater for males than for females; the rise in death rates from buccal and respiratory tract cancer is more than 4 times greater. Public health statistics for Los Angeles County (Calif.) show that during the worst fog of Sept. 23, 1949, 18 more respiratory and cardiac deaths occurred than for the daily average during the Donora, Pa. episode.

469

Minkoff, G. J., 1954
and N. V. V. Parthasathi.
A SEMIMICRO GAS ANALYSIS APPARATUS FOR THE DETERMINATION OF THE PERMANENT GASES. Analyst, v. 79, June 1954: 379-382.
DLC (QD71. A45, v. 79)

A semimicro gas analysis apparatus to analyze samples of from 0.5 to 3 ml of gas has been developed for the determination of carbon dioxide, hydrogen, oxygen, carbon monoxide, methane, and nitrogen. The basic features of the method are the combination of oxygen with hydrogen and carbon monoxide in the presence of copper oxide at 285°C, and the subsequent removal of excess of oxygen by copper, also at 285°C. The water and carbon dioxide formed are frozen out separately in solid carbon dioxide and liquid air traps, and the pressure of the gas, in a constant volume, is measured at each stage. The pressures of the water and carbon dioxide formed indicate the original concentrations of the 3 gases. Methane is oxidized over the Arneil catalyst at 600°C, and the pressure of the remaining nitrogen is measured directly. (Authors' abstract in part)

470

Mittler, S., 1956
and others.
TOXICITY OF OZONE. I. ACUTE TOXICITY. Indus. Med. and Surg., v. 25, July 1956: 301-306, illus.
DLC (RC963. A37, v. 25)

The acute and subacute toxicity of ozone for several laboratory animals was studied experimentally. The LD_{50} for a 3-hr exposure of ozone was found to be 21 ppm for mice, 21.8 ppm for rats, 34.5 ppm for cats, 36 ppm for rabbits, and 51.7 ppm for guinea pigs. Edema occurred in the lungs of rats exposed to 6 ppm for 18 hr; no damage was caused by 24-hr exposure to concentrations of less than 3 ppm ozone. (Authors' abstract in part)

471

Mock, F. C. 1955
OFTEN OVERLOOKED FACTORS OF IDLING CYCLE DISCUSSED. S.A.E. Trans., v. 63, 1955: 618-619.
DBS

Several factors which cause the incomplete combustion of gasoline during idling cycle are mentioned. The use of degassers and the maintenance of engines to fire steadily without missing on a carburetor idle adjustment that will give a lean-smelling exhaust are suggested.

472

Möbus, W. 1955
[ELECTRICAL GAS PURIFICATION] Elektrische Gasreinigung. Zeitschr. Erzbergbau und Metallhüttenwesen, v. 8, Mar. 1955: 107-109.
DBS

Brief descriptions and illustrations are given of electrical equipment used in gas purification by German metallurgical plants. The present status of purification of waste gases in the industry is summarized briefly.

473

Molner, J. G., 1952
and W. G. Frederick.
THE DETROIT-WINDSOR AIR POLLUTION STUDY. ENVIRONMENTAL STUDIES--HEALTH ASPECTS. Pub. Health Rep., v. 67, July 1952: 669-671.
DLC (RA11. B17, v. 67)

In a preliminary survey, a number of comparable sites in low- and high-pollution areas were selected for study of the significant socio-economic factors of income, nutrition, medical care, race, age, and family sanitation practices. It was concluded that only a general plan could be evolved prior to actual field work, and that the procedure for the general health study would be developed from a pilot study. In order to obtain community cooperation a health advisory committee -- representing all phases of community life and institutions--was established for the Detroit-Windsor air pollution study. It was decided that the only direct method for obtaining the comparative health status of population groups in this study was through monthly interviews with a sufficient sample of family groups, possibly using pairs of contrasting areas. Pertinent health data are also available in Public Health Dept. records, etc.

474

[Morris, R. A., 1956
and J. P. Strange].
ION CHAMBER PICKS UP POLLUTANTS. Chem. and Eng. News, v. 34, Dec. 31, 1956: 6430.
DLC (TP1. C35, v. 34)

An ionizing chamber device which is sensitive to extremely low concentrations of certain gases and vapors, has been developed by physicists of Mine Safety Appliances Co. The contaminants are reacted with another gas to form smoke or mist particles; the effect of the particles on an ion chamber is picked up by a Wheatstone bridge. The particles cause a pronounced drop in ion current, giving a more sensitive system and thus make it possible to measure minute concentrations of gases and vapors. A radioactive source (50 to 100 micrograms of radium) within the chamber ionizes the air samples continuously. Hydrogen halides and organic acid vapors are picked up directly in ppb, using an ammonia reagent. Hydrogen cyanide, ammonia, and many amines are detected directly with acetic acid vapors or anhydrous hydrogen chloride. Halogenated hydrocarbons (carbon tetrachloride, trichloroethylene, and methyl bromide) are picked up by pyrolyzing the sample before it enters the ion chamber. (Quoted in part)

475

1954
MORTALITY AND MORBIDITY DURING THE LONDON FOG OF DECEMBER 1952. Gas World, v. 140, Aug. 28, 1954: 498-500.
DLC (TP700.G2, v. 140)

The pollutants present in the air during the London smog of 1952, derived mainly from the products of coal combustion, caused respiratory irritations which were lethal only to people already suffering from respiratory or heart disorders. Information on deaths during the smog was obtained from death certificates, and from the results of autopsies. Deaths during the smog increased 2.6 times over the deaths during the preceding week. The pollutants believed to cause respiratory irritation are "particles of tarry matter and the oxides of sulfur". The permissible amounts of sulfur dioxide and sulfur trioxide in the atmosphere are estimated. Comparisons of the pollution present in the air during the smog, and during the same period in another yr are discussed.

476

Mosshart, D. J. 1952
HOW TO ACHIEVE SMOKELESS OPERATION OF SPREADER STOKERS. Mech. Eng., v. 74, June 1952: 462-464, illus. DLC (TJ1.A72, v. 74)

Two problems encountered at low combustion rates, i.e., below 200,000 Btu/sq ft of grate/hr, are: (1) regulation of excess air for good efficiency; and (2) operation without smoke. Smoke at low combustion rates is caused by the cracking of hydrocarbon vapors which have not been burned sufficiently. The best means of controlling excess air in the furnace has been obtained by using a row of small air jets about 12 in. from the grate and a row of larger jets about 3-4 ft above the grate. Two arch-type furnaces for operation at low combustion rates are pictured. Diagrams of good and bad furnace designs are given.

477

Moyerman, R. M. 1953
and K. E. Shuler.
CONCENTRATION OF CONTAMINANT ALKALI SALTS IN GROUND LEVEL AIR. Science, v. 118, Nov. 20, 1953: 612-614. DCU

The alkali halide concentration in ground level air at coastal and inland sites is presented. The results are based on a 1:1 equivalence of sodium: chloride (which is subject to error). In general, the air at the coastal sites had a higher concentration than the air from inland sites. The sites incorporated in this study are representative of the northern temperate zone and include samples from western United States, Europe, Africa, and Asia.

478

Müller, R. H. 1954
FORWARD-SCATTERING PHOTOMETER MAY PROVE INDISPENSABLE FOR MEASURING AND CONTROLLING OUTDOOR AND INDOOR AIR POLLUTION. Analyt. Chem., v. 26, Aug. 1954: 33A-34A, illus. DLC (TP1.I615, v. 26)

The forward-scattering smoke photometer, a complete self-contained instrument for measurement of the mass concentration of particulate matter in the atmosphere, is described fully, and a diagram shown. The range of concentration observable with this photometer, manufactured by the Phoenix Precision Instrument Co., is about 100,000 times, enough to include all outdoor and most indoor air pollution. Also included are brief descriptions of a photometer for logarithmic measuring of mass concentration, and an arrangement for precise indication over a limited concentration range.

479

Müller, R. H. 1955
PORTABLE APPARATUS ANALYZES MULTI-COMPONENT MIXTURES. Analyt. Chem., v. 27, June 1955: 33A-36A. DLC (TP1.I615, v. 27)

The operation of a vapor fractometer, by which vapors are separated on a partition column, is described and diagrammed. The performance of the instrument is shown as a series of peaks, the area under each being a measure of that fraction. Samples as small as 1 mg can be determined in 0.5 - 5 min for each component, with a reproducibility better than 0.5%.

480

Mullin, J. W. 1955
RECENT ADVANCES IN GAS ABSORPTION, COOLING, AND HUMIDIFICATION. Chem. Age, v. 72, Jan. 8, 1955: 133-140.
DLC (TP1.C33, v. 72)

The theoretical considerations in gas absorption are discussed in view of various methods and types of equipment which have been developed recently. Those applicable to carbon dioxide absorption are reviewed including: (1) the absorption of gases in various solutions; (2) centrifugal absorbers; (3) jet or venturi scrubbers; and (4) washers fitted with irrigated fiber pads.

481

Munger, H. P., 1952
and R. B. Engdahl.
AIR-POLLUTION ABATEMENT IN INDUSTRIAL COMMUNITIES. Battelle Tech. Rev., v. 1, Mar. 1952: 24-29. DLC (Z7403.B35, v. 1)

Methods of determining the 3 types of atmospheric contaminants, i.e., dirt fall, aerosols, and noxious gases are discussed. A simple, effective method of correlating dirt fall with its originating source uses a dirt-fall collector having a wind-direction attachment. A collector is set in each of 8 different wind directions, the dust from a particular sector being deposited in a particular collector. Gases and particulate matter in the atmosphere have been collected utilizing kite balloons to carry samplers aloft.

482

Munger, H. P. 1952
THE ENGINEERING APPROACH TO CLEANER AIR FOR THE COMMUNITY. Amer. Jour. Publ. Health, v. 42, Aug. 1952: 936-946, illus.
DLC (RA421. A41, v. 42)

Air pollution may be approached from 2 points of view -- public health or engineering. The maximum permissible concentration of many contaminants which will be harmful in the community is not clearly established. Technology is available to eliminate smoke and handle most of the fly ash problems. Each plant industrial problem must be analyzed individually to secure the most economical solution to the problem. A great deal of information is available as a guide in sampling and analyzing air contaminants. The newer technics make possible the determination of the concentration of air contaminants at various altitudes as well as at ground level. Meteorological observations at chimney-top level and higher are important. A new continuous aerosol analyzer and a dirtfall collector indicate the wind direction from which the largest amount of air contaminants is coming. A low velocity wind tunnel, condensation-nuclei recorder, miniature venturi scrubber, and other equipment are being perfected to furnish specific information. Close coordination between the public health and air pollution control officers, industry, and research organizations is required. Education of all parties concerned will be necessary. With a cooperative effort, progress will be made, and the air will gradually improve as additional equipment is perfected and used. (Author's abstract)

483

Munroe, W. A. 1956
AUTOMATIC INSTRUMENTATION FOR AIR POLLUTION MONITORING. Amer. Indus. Hyg. Assoc. Quart., v. 17, Sept. 1956: 298-302, illus. (Paper presented at the 17th Annual Meeting, American Industrial Hygiene Association, Philadelphia, Pa., Apr. 26, 1956) DLC

The instrument described is basically an automatic, portable, directional air sampler designed to operate at 1 test site and to collect from 4 or 8 positions of the compass. The device has an automatic timer, and an automatic shut-off for both low and high wind speed. In the latter case, a "still-wind" sample is taken. No conclusive evidence can be offered following operation of this pilot model, but experience has indicated some of the design factors which should be considered.

484

Murakami, T., 1955
and S. Fukunaga.
STUDY ON THE MEASURING METHOD OF INDUSTRIAL DUST CONTENT IN THE AIR BY A VERY SMALL CYCLONE SEPARATOR. Bull. Naniwa Univ., v. 3, ser. A, 1955: 37-46.
DLC

Methods of measuring and controlling industrial dust emissions are given. Using a small cyclone separator, an experimental mixture of cement powder, wood ash, and air was drawn into the test system by suction and separated by centrifugal force; the dust collected was measured by microscope. The mixture, with particles 0.8 - 1.0 micron in diameter, was drawn through a Tyler Standard Screen of 325 mesh at an air velocity of 23 m/sec. Various diagrammatic illustrations of the apparatus and operating conditions are presented. The collection efficiency, 99%, is given as the ratio of the weight of dust collected to the weight of dust fed into the system. Knowing these 2 values, the density of the dust can also be calculated.

485

Myhill, A. R. 1954
GAS ANALYSIS AS AN AID TO RETORT HOUSE CONTROL. Gas World, v. 140, Aug. 28, 1954: 501-503, 508. DLC (TP700. G2, v. 140)

Various methods for analyzing gases from heating systems or flue gas streams and from retorts are given. Sampling under suction or aspiration is accomplished by spot samples taken into a portable apparatus, or by long-period samples to obtain more complete information. For simple analyses, an Orsat apparatus with potash, pyro, and cuprous chloride pipettes to determine carbon dioxide, oxygen, and carbon monoxide, respectively, can be used. The Birmingham-modified Orsat is recommended for analysis of carbon dioxide, unsaturated hydrocarbons, oxygen, carbon monoxide, and nitrogen. Examples of typical analyses to determine the compositions of producer gas, flue gases, and crude coal gas are discussed.

486

Nagelschmidt, G., 1952
R. L. Gordon, and O. G. Griffin.
SURFACE OF FINELY-GROUND SILICA. Nature, v. 169, Mar. 29, 1952: 539-540.
DLC (Q1. N2, v. 169)

In the course of silicosis research, a photographic-densitometric x-ray diffraction technique was developed for quantitative determinations of quartz, using magnesium oxide as internal standard, and recording line intensities in the range of 1.18 - 1.22 kX. With this technique, it was found that carefully graded samples of quartz of less than 2-micron diameter gave lower intensities than larger fractions, although the fine samples showed only very slight indications of line broadening, and those only in the back-reflection region. In order to test the idea that an outer, possibly amorphous, layer existed on the quartz crystals, they were subjected to a severe etching with hydrofluoric acid. The residues showed a higher quartz rating. If the assumption is made that the outer layer is entirely amorphous and does not absorb x-rays, it is possible to estimate the thickness of this layer. (Authors' abstract in part)

487

Nagelschmidt, G., 1954
and others.
THE DEVELOPMENT OF LYMPH NODES AFTER INJECTION OF FLINT OF VARIABLE SIZE INTO THE LUNGS OF RATS. Brit. Jour. Indus. Med., v. 11, Apr. 1954: 145-150, illus.
DLC (RC963.A23, v. 11)

Lymph nodes of rats, following the injection of flint [particles] of variable sizes into the lungs of rats, were weighed and the amount of flint in the nodes was determined. The nodes swelled more rapidly to their final size with the smaller than with the larger flint fractions. The fraction 1-2 microns gave the largest nodes and highest amounts of flint, and the fraction 4-8 microns caused only little and erratic node enlargement. The effects of size of flint [particles] were very regular. With the 3 finest size classes, 18-20% of the dose given was recovered from the nodes after 1 yr. In attempts to interpret the finding, it is suggested that the dust cells have difficulty in transporting the larger flint particles because of their size, that the smallest particles may be readily transported to the hilar lymph nodes, but are later partly passed on to other sites, and, possibly, partly dissolved, while those of medium size (e.g., 1-2 microns) are both readily transported and retained by the lymph nodes. (Authors' abstract)

488

Neerman, J. C., 1956
J. L. Parsons, and F. R. Bryan.
A CONTINUOUS FLOW METHOD OF DETERMINING UNBURNED FUEL IN AUTOMOTIVE EXHAUST. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 38-40, 47, illus. DLC

A description is given of instrumentation, procedures, and resulting quantitative determinations of C_3 and higher fuel components on both engine dynamometer and vehicle road tests. Since the instrument response time is within 2 sec, the measurement of transitional, as well as steady state operating conditions is possible. The limit of detection is approximately 0.01 mole-% of hydrocarbon. Concentrations ranging from 0.05 to 1.0 mole-% are accommodated effectively. Tabular data are shown for preliminary results of tests on automobile exhaust gases as a cause of air pollution using an infrared analyzer (interference filter photometer) and an airflow meter.

489

Nelson, N. 1955
SOME TOXICOLOGIC ASPECTS OF ATMOSPHERIC POLLUTION. Amer. Jour. Pub. Health, v. 45, Oct. 1955: 1289-1301, illus. (Paper presented at the Engineering Section of the American Public Health Association, 22nd Annual Meeting, Buffalo, N. Y., Oct. 14, 1954)
DLC (RA421.A41, v. 45)

Major effects of air pollution can be considered in 3 broad categories: economic loss, such as spoilage of merchandise; annoyance, such as odors and eye irritants short of eye damage; and health impairment. In the latter category, effects on respiratory system either directly or indirectly are the major health problems in air pollution. Information on respiratory irritants and lung cancer is presented. Concerning the general problem of respiratory irritants, the following are considered: the possibility of increased susceptibility in the ill, the aged, or the very young; the physical state of the irritant; and the fact that nonspecific irritants acting separately or additively may be one of the most important of toxic effects of air pollutants. Data indicate that: the incidence of lung cancer is probably higher in urban than in rural groups; and that urban and industrial areas have higher concentrations of known carcinogens; however, no definite conclusions can be based on these 2 possibly related factors at this time. Assuming equal susceptibility of men and women to lung cancer, then smoking (which in women has only recently approached that indulged in by men) rather than air pollution (to which both sexes have been equally exposed) might account for the greater incidence of lung cancer in men.

490

NEW DEVICE FOR ELIMINATING INDUSTRIAL SMOKE. Chem. and Process Eng., v. 33, Dec. 1952: 683. 1952
DLC (TP1.C355, v. 33)

"A new device for the smokeless burning of petroleum fumes has been demonstrated at Linden, N. J., by the Esso Standard Oil Co.... The device consists of 3 concentric masonry stacks, the largest of which is 30 ft high and 14 ft in diameter. Gas and water are combined in the small innermost stack. As they emerge, 2 pilot lights ignite the mixture for initial combustion in the second stack. The third and outer stack affords a larger and better draft for the final flaring of the mixture, thus confining the entire operation within the safety flare itself." (Quoted in part)

491

NEW INCINERATOR PROMISES LESS SMOG. Eng. News-Rec., v. 157, Oct. 11, 1956: 47-48. 1956
DLC (TA1.E61, v. 157)

A new 90-ton capacity furnace has doubled the capacity of the municipal incinerator at Glendale, Calif., and yet emits less than 0.4 grains/cu ft of particulate matter with a gas volume adjusted to

12% carbon dioxide. The rubbish fed to the incinerator is compacted into the ignition chamber, and moved evenly across the grate bed. The gases pass to a combustion chamber, through a spray tower, and into a gas washer where the particulate matter is reduced to a minimum.

492
1956

NEW SCRUBBER AND ABSORBER. Chem. Age, v. 74, Jan. 14, 1956: 152. DBS

The turbo fume scrubbing and absorption tower, manufactured by Turner and Brown Ltd., is designed to eliminate from 14-20 liters of evaporated acids/hr. These include sulfuric, hydrochloric, or nitric acid fumes discharged from industrial and chemical processes. Most of the gases are absorbed in liquid, and suspended globules of moisture are then eliminated. Any traces of acids remaining are neutralized by a chemical reagent contained in a tray which can be removed for recharging.

493
1955

NEW TOWER PACKING DEVELOPED. Chem. Age, v. 73, Aug. 20, 1955: 369, 378. DBS

Spraypak is an efficient tower packing fabricated from expanded metal. It was developed by the British Atomic Energy Research Establishment, Harwell. Some installations and tests of the packing material are described. The proposed uses of Spraypak include atmospheric-pollution abatement applications.

494
1956

NEW YORK CITY ISSUES NEW AIR POLLUTION REGULATIONS. Amer. City, v. 71, Mar. 1956: 231. DLC (HT101.A6, v. 71)

Four new regulations have been issued in New York to stiffen air-pollution control: "(1) gasoline or diesel buses must emit no visible smoke or fumes after they have moved 100 yd or more and must emit none while stationary; (2) bus drivers must not idle motors for more than 3 min while 'standing' a bus at a route terminal; (3) all gasoline buses are given 9 months before they must be equipped with fume-reducing devices; (4) operators of fuel-burning equipment using residual oil or bituminous coal must install a smoke-recording device if they have a record of air pollution violation." The Department of Air Pollution Control in New York also announced that the average amount of soot fall decreased from 162 to 61.7 tons/sq mi/ month, and convictions for air-pollution violations increased from 224 in 1952 to 550 in 1954.

495

Nielsen, J. P., 1954
H. M. Benedict, and A. J. Holloman.
FLUORESCENCE AS A MEANS OF IDENTIFYING SMOG MARKINGS ON PLANTS. Science, v. 120, July 30, 1954: 182-183. DCU

An experiment is described for the quantitative assessment of the markings on plants caused by smog. Ultraviolet examination of smog-marked plants revealed that marked regions show a pale blue fluorescence, while unmarked regions do not fluoresce unless fungus hyphae or insect deposits are present. A variety of plants marked by possible air contaminants was tested.

496
1956

NO MORE EXHAUST SMOKE IN PHILADELPHIA. Amer. City, v. 71, May 1956: 166.
DLC (HT101.A6, v. 71)

"In Philadelphia, Pa. smog induced by exhaust gases will be nipped in the bud by a new regulation passed in Feb. 1956. Under its terms, no motor vehicle will be permitted to emit visible fumes, gases, smoke, vapors, or mists other than water except for the first 100 yd after starting. The regulation also provides that persons maintaining or operating motor vehicles for commercial purposes shall conduct periodic visual and odor tests of motor exhausts. Motors must be maintained, and drivers should be instructed along lines that minimize air pollution. The regulation is enforced by the city's Air Pollution Control Section. Raymond Smith, chief of the section, will supply copies of the ordinance to cities interested." (Quoted in full)

497
1955

NO SMOG, POLLUTION, OR ODORS. Petroleum Processing, v. 10, Nov. 1955: 1726-1728.
DLC (TP690.A1P37, v. 10)

The proposed 25,000 barrel/day, $30,000,000-refinery of Standard Oil Co. of California, to be built on Sand Island at the entrance to Honolulu, Hawaii harbor, is to use the following measures to prevent air and water pollution: "(1) Floating roof tanks for gasoline and other light [petroleum] products. (2) All waste separators containing light distillates are to be covered to prevent air pollution. (3) All gasoline pumps will be equipped with mechanical shaft seals. (4) Hydrogen sulfide will be recovered and converted to sulfur. (5) Flue gas from the catalytic cracking unit will be completely incinerated. (6) Electrostatic precipitators will be used to remove dust from the cracking unit flue gases. (7) A closed safety relief discharge system will return gases through recompression to the refinery fuel system. Excess gases in the event of an emergency will be burned in a smokeless flare."

498
1955

NO SURE CURES. Chem. Week, v. 76, May 14, 1955: 104, 107-108. DLC (TP1.C37, v. 76)

Papers delivered at the 3d National Air Pollution Symposium are reviewed. Brief discussions are given on the following: progress made by the chemical and automobile industries; results of a study on oxidized-hydrocarbon relationship to plant damage and eye irritation; pollutant movements; phys-

iological effects of air pollution on animals and humans; the federal government's interest in air pollution; legal aspects; and smog attack at Los Angeles.

499

Nolan, P. J., 1955
and T. C. O'Connor.
THE PHOTOELECTRIC NUCLEUS COUNTER AS HYGROMETER. Geofis. pura e appl., v. 31, May-Aug. 1955: 32-36. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) DGS

A method is described for determining the hygrometric state of air by photoelectric measurements on the cloud formed by an adiabatic expansion, using a Nolan-Pollak nucleus counter from which the lining of blotting paper had been removed. The experimental procedure was to determine the critical overpressure corresponding to the onset of condensation. The results compare favorably with those obtained by means of a ventilated wet and dry bulb hygrometer.

500

1955
NOW YOU SEE IT! NOW YOU DON'T! THANKS TO NEW POLLUTION CONTROL. Safety Maintenance and Production, v. 109, Apr. 1955: 55-56. DA

This article reports on a tour of the Cleveland "Flats" area, conducted by officials of the American Steel and Wire Division of the United States Steel Corp. to show the progress made in reducing air pollution. The dust from industries in this area has been reduced 22.7 tons/month from the 50 tons/month in 1947. Electrostatic precipitators, and stack gas scrubbers and washers have removed 99% of the flue dust from blast furnace gas. As a result "an emission of smoke and dust particles 40 times less than the Cleveland city ordinance requires" is obtained.

501

Nurse, R. W. 1956
THE UTILIZATION OF FLY ASH FOR BUILDING MATERIAL. Jour. Inst. Fuel, v. 29, Feb. 1956: 65-88, illus. DLC (TP315.I6, v. 29)

The Building Research Station (England) has, since 1946, been carrying out research on the use of industrial wastes, such as pulverized-fuel ash, in the building industry. At first, attention was directed towards autoclaved aerated concrete products such as are available commercially. More recently work has been concerned with bricks containing 85 parts of ash to 15 parts of plastic clay, and to sintered ash to be used as lightweight aggregate. Some data are given on the use of pulverized-fuel ash as pozzolana. (Author's abstract in part)

502

1956
ODOR AUDIT AND CONTROL. PROCTOR AND GAMBLE DETERMINES ITS ODOR OUTPUT QUANTITATIVELY BEFORE DETERMINING MODE OF ATTACK. Chem. and Eng. News, v. 34, June 4, 1956: 2794, 2796.
DLC (TP1.C35, v. 34)

One odor unit, as defined by the Proctor & Gamble, Co. is the amount of odor necessary to contaminate 1 cu ft of clean air to the barely perceptible or threshold level. A piece of P & G equipment known as "Osmo"-- a 100-lb unit consisting of a cylinder with 528 holes-- is effective for measurement of odor intensity, but is cumbersome. Also in saturated conditions, the condensate contaminates the equipment, and a power source is required. A recent technique, which eliminates most of these difficulties, uses 100-cc hypodermic syringes to withdraw samples from air ducts. Taken to an odor-free room, increasingly larger portions of the sample, mixed with odor-free air, are introduced into the nostrils until the threshold is reached. A source of error may result when determining weak odors since a certain amount of dilution takes place in the nostrils. Total odor emission is estimated as the product of total air flow in ducts or stacks times odor intensity. Use of stacks for odor control are considered to be most effective and economical in most situations. Control, especially by other types of equipment, tends to be expensive having cost the company $3 million since 1945. Some of the types of equipment which have been used are: centrifugal separators or cyclones; air filters; activated carbon filters; venturi scrubbers; packed scrubbers; spray condensers; odor furnaces; and enclosed vent systems.

503

1953
ODOR-POLLUTION CONTROL. Mech. Eng., v. 75, Oct. 1953: 815-816. DLC (TJ1.A72, v. 75)

The Oxycat, a new catalyst composed of catalytic alumina and platinum alloy, removes smoke and odors from plant stacks. The basic design includes 2 porcelain plates separated by a porcelain spacer bar, and 73 upright porcelain rods coated with a 0.003-in. film of the catalyst. The contaminating fumes and gases are burned below their normal ignition temperatures, and the heat produced is used as a fuel source. The apparatus can economically purify from 5-20 standard cu ft/min.

504

Ogiwara, S., 1952
and T. Okita.
ELECTRON-MICROSCOPE STUDY OF CLOUD AND FOG NUCLEI. Tellus, v. 4, Aug. 1952: 233-240, illus. DLC (QC801.T4, v. 4)

By means of an electron-microscope and a chamber of constant humidity, the nuclei of droplets of clouds from a mountain area and fog from an ur-

ban area were studied. The nuclei were not made up of sea-salt; they were similar in form and nature to the hygroscopic particles in haze, and to the artificially produced combustion particles. It was concluded that both the cloud and the fog nuclei originated in combustion products which were a mixture of hygroscopic and nonhygroscopic substances.

505

O'Mara, R., 1955
C. Flodin, and R. Plass.
DUST AND FUME PROBLEMS IN THE CEMENT INDUSTRY. Air Repair, v. 4, Feb. 1955: 203-209. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Selection of dust collection equipment varies with raw materials and fuel, type of kiln feed, type of kiln, and means of heat recovery. Eight plants typifying these variables are described, namely: a dry process plant, a wet plant, a dry process plant using slag and lime rock for raw materials, a wet process plant with filters and waste heat boilers, a wet process plant using oyster shells, a wet process plant with dust nodulizer, a dry process plant with Lepol kiln, and a dry process plant with countercurrent heat recovery by raw material. There are 164 cement plants in the United States and Canada. The delivered cost of mechanical collectors is from $0.25 to $0.50/cu ft/min, and of electrostatic precipitators $0.80 to $2.00/cu ft/min. Power requirements of electrostatic collectors are from 8 to 10 kw/1,000,000 cu ft of gas cleaned. (Public Health Eng. Abstracts, v. 35, Apr. 1955: 4)

506

O'Reilly, L. F., 1954
and W. J. Fadden, Jr.
ROUGE PLANT MODERNIZES ITS STEAM GENERATION. Combustion, v. 26, Aug. 1954: 34-39. DLC (TJ1.C8, v. 26)

An illustrated discussion of the expanded steam generation facilities at the Rouge Plant (Mich.) of the Ford Motor Co. is presented. The expansion included installation of Aerodyne dust collectors and fly-ash handling equipment designed to limit the emission of fly ash to 0.2 grains cu ft, with 92% efficiency. Each generator has a stack extending 168 ft from the roof level, equipped with 2 induced draft fans.

507

Owston, J. 1952
ROCKET PROPELLANTS: THEIR TOXIC EFFECTS, HAZARDS, AND FIRST AID. Roy. Army Med. Corps Jour., v. 98(3), 1952: 157-169. DNLM

Rocket propellants are made up of an oxidant (e.g., nitric acid, hydrogen peroxide, liquid oxygen) and a fuel (e.g., kerosene, methanol). Inhalation of nitrogen oxides from propellants may cause severe symptoms and terminate in death within 5 to 8 hr; the degree of susceptibility varies with the individuals. Inhalation of concentrated hydrogen peroxide produces no serious effects; nor does liquid oxygen. Inhalation of hydrazine gives rise to mild respiratory disturbances. Methanol vapor inhalation has an injurious effect on the central nervous system. The symptoms (weakness, nausea, abdominal pain, dimness of vision) are delayed for 9-36 hr. Kerosene does not vaporize sufficiently to cause toxic symptoms at normal temperatures because of its low volatility. Methods of first aid treatment of the various toxic symptoms are summarized.

508 1956

OZONE: POTENTIALLY HAZARDOUS. Chem. and Eng. News, v. 34, Sept. 24, 1956: 4704. DLC (TP1.C35, v. 34)

Individuals continually exposed to ozone concentrations above 0.1 ppm may develop headaches and dry throats. Considering that 1/4 of the ozone inhaled reaches the lungs, it has been estimated that 50 micrograms of ozone are sufficient to kill a rat, and that exposure during exercise increases ozone toxicity. On the other hand, it has been shown that animals frequently exposed to small amounts of ozone develop a tolerance which may last for several months.

509

Palmer, L. C., 1953
and G. E. Best.
AIR POLLUTION CONTROL IN A CHROMIUM CHEMICALS PLANT. Amer. Indus. Hyg. Assoc. Quart., v. 14, Dec. 1953: 294-298, illus. DLC

Methods used in a new plant for the manufacture of sodium bichromate which effectively controlled the dust pollution of the atmosphere of a surrounding industrial and residential section of Baltimore, Md. are described.

510

Panataleoni, R. 1956
AN APPROACH TO ODOR CONTROL. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 213-215, illus. (Paper presented at the 48th Annual Meeting of the Air Pollut. Control Assoc. at Detroit, Mich., May 23-26, 1955) DLC

Malodorous gaseous material in the atmosphere was sampled either by absorption with a liquid, or adsorption with a porous substance. Quantitative analysis of the samples provided a rational basis for specifying the quantities of odor counteractant needed for a given stack effluent or odorous atmosphere. The collected odorant samples were used for formulation of counteractants by the following methods: malodor testing using the counteractant mixtures on blotter strips until satisfactory odor control was verified by experts; infrared testing of extracted and dried sample using a double beam infrared spectrophotometer; recreation of the odorous atmosphere, by use of aerosolized malodors, in a test room. The odor control agent was added directly to the cooking process, or along with the other reagents in the manufacturing process. In other situations, it was atomized over waste-collecting lagoons, or at either the base of the stack or at a point sufficiently below the top of the stack to insure good mixing with the effluent gases.

511

Parker, A. 1953
THE LONDON FOG DISASTER. Gas World, v. 138, Oct. 10, 1953: 901-902.
DLC (TP700.G2, v. 138)

When the air near the ground is cooler than air above, there is no wind, and the air is moist, fog forms. In open country, it is a whitish color, while in industrial areas, smoke, gases, and fine particles are absorbed by the mist to form a grayish cloud. During the London fog of 1952, instruments in 1 section measured 103-375 mg of smoke/100 cu m, and 47-107 parts of sulfur dioxide/100 million parts of air. This is 5 times the amount present on a normal day. It is stated that domestic heating appliances present a greater problem to smoke abatement than industrial furnaces.

512

Parker, A. 1955
HOUSE HEATING AND ATMOSPHERIC POLLUTION. Advanc. Sci., v. 11, Mar. 1955: 418-422. Also published in Coal Merchant and Shipper, v. 109, Dec. 25, 1954: 523-525.
DLC (Q41.B812, v. 11)

The uses of coal products, the resulting pollutants, and the substances that make up the pollutants are tabulated. The weight of the substances in smoke amount to about 2,000,000 tons/yr, and the average concentration of sulfur dioxide in the atmosphere is about 3-4 parts/100,000. Some ways of reducing smoke emission are: (1) more efficient coal-burning equipment; (2) central heating for large buildings; and (3) development of smokeless fuels.

513

1956
Parsons, J. L.,
M. J. Irland, and F. R. Bryan.
CONTINUOUS FLOW INFRARED GAS ANALYZER EMPLOYING INTERFERENCE FILTERS. Jour. Opt. Soc. Amer., v. 46, Mar. 1956: 164-166.
DLC (QC350.O6, v. 46)

A filter photometer for the continuous determination of a single component of a gaseous mixture is described. The instrument incorporates a combination of band pass and long wavelength pass filters of the interference type, designed to transmit in the near infrared. The analyzer has been calibrated to determine hydrocarbons in automotive exhaust gases by means of absorbance measurements at 3.43 microns. Two sets of calibration curves are given, and the average deviation of the calibration values from the curves drawn is about 2.1%. (Authors' abstract in part)

514

1955
PARTICLE SIZE DISTRIBUTION ANALYSER. Engineer., v. 199, Feb. 25, 1955: 283.
DLC (TA1.E5, v. 199)

The micromerograph is designed to analyze particles in the size range of 1-250 microns in a total time of 1-3 hr depending on the density and size of the particles. Approximately .1 g of the powder, introduced into the analyzer, is broken up by a jet of dry nitrogen and injected into a sedimentation chamber where the particles settle out, and are weighed by an automatic torsion balance. The weights are recorded on a time chart.

515

Patterson, C. R. 1955
AIR POLLUTION CONTROL AS IN EFFECT ON THE CANADIAN NATIONAL RAILWAYS. Air Repair, v. 4, Feb. 1955: 188. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The most troublesome points of [railroad] operation from the standpoint of air pollution control are at Toronto, Ontario and Montreal, Quebec. To reduce pollution to a minimum, all hand-fired engines are equipped with overfire jets, and most main terminals are equipped with an oil steaming-up system. Full-time smoke supervisors enforce regulations, and a continuous employee education program is carried out. (Public Health Eng. Abstracts, v. 35, June 1955: 1)

516

Patterson, G. D. 1952
DETERMINATION OF SULFUR DIOXIDE BY COLOR-CHANGING GELS. Analyt. Chem., v. 24, Oct. 1952: 1586-1590.
DLC (TP1.I615, v. 24)

Present methods of determining small amounts of atmospheric sulfur dioxide are inconvenient and time-consuming. In the current studies several granular gels are described which change color when exposed to 150-ml air samples containing 10 ppm of sulfur dioxide. The gel is placed in a glass tube, and the air sample is drawn through the tube. Three methods of quantitative estimation may be used: the colors which appear on the various gels may be matched with standard color cards; the length of a colored column may be measured; or the sample volume necessary to produce a desired color or length of colored column may be observed. These gels provide a simple pocket-sized method for estimating physiologically dangerous concentrations of sulfur dioxide in the atmosphere. (Author's abstract)

517

Patton, H. W., 1955
and J. S. Lewis.
FRACTIONATION AND ANALYSIS ON A MICRO SCALE BY GAS CHROMATROGRAPHY. (Abstract). Analyt. Chem., v. 27, June 1955: 1034. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955)
DLC (TP1.I615, v. 27)

The need for a more efficient means of fractionating and analyzing air pollutants prompted a study of the usefulness of gas chromatography for these purposes. The apparatus and techniques were altered to enhance efficiency of separation and sensitivity to trace components. Minimum concentrations detectable with a thermal conductivity detector were established for several substances reported or believed to be present in smog. The possibility of combining gas chromatographic separation and mass spectrographic identification was studied. Actual smog concentrates were not investigated, but automobile exhaust gases were analyzed. Several light hydrocarbons were detected with a thermal conductivity detector by simple elution of a small sample of raw exhaust gas from a column of adsorbent. Other components were identified by gas chromatographic separation of material condensed from a large volume of exhaust gas. Since micro quantities of volatile mixtures may be fractionated efficiently, gas chromatography is useful for analysis of air pollutants. (Authors' abstract)

518

Paulus, H. J., 1954
E. P. Floyd, D. H. Byers.
DETERMINATION OF SULFUR DIOXIDE IN ATMOSPHERIC SAMPLES. COMPARISON OF A COLORIMETRIC AND A POLAROGRAPHIC METHOD. Amer. Indus. Hyg. Assoc. Quart., v. 15, Dec. 1954: 277-282, illus. DLC

Analysis for sulfur dioxide content was made on atmospheric samples—collected in 0.05 N sodium hydroxide solution containing 2% glycerol—by both polarographic and colorimetric procedures. The former method was found to be somewhat less sensitive but to have a greater useful range. The methods had about equal reproducibility (± 2%), but consistently lower results (2 to 7%) were obtained by polarographic methods for actual atmospheric samples even though results for standard solutions of sodium metabisulfite showed good agreement on analysis by the 2 methods. This latter discrepancy was thought to be caused by tautomerism of sulfuric acid or an unidentified interference in the atmospheric samples. The colorimetric determinations, using a portable-type filter photometer in the field, compared favorably with those made with the more expensive laboratory-type spectrophotometer. (Authors' abstract in part)

519

Pearcy, T., 1956
and G. W. Hill.
THE ACCELERATED MOTION OF DROPLETS AND BUBBLES. Austral. Jour. Phys., v. 9 (1), 1956: 19-30. TID

The drag force acting upon small particles such as droplets and bubbles, moving through a viscous medium, depends upon the rate of change of the state of motion of the medium and upon the diffusion of vorticity from the surface of the particle. For accelerated particles, the drag force changes with time and depends upon all previous accelerations. The equation of motion of a particle takes the form of an integro-differential equation, which has been solved numerically in the case of deceleration to rest from uniform motion with no impressed body forces. In any experiments designed according to the principles of dynamical similarity, the ratios of viscosities and densities of the medium and the particle must be maintained constant in the scale transformations involved. (Authors' abstract)

520

Peterson, A. H. 1956
MEASUREMENT OF THE VISIBILITY ASPECT OF AIR POLLUTION BY MEANS OF LIGHT SCATTERINGS. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 212-247, illus. DLC

An instrument for measuring the right-angle scattering of light is described; it can be operated to obtain a continuous record. Readings are obtained which give a ratio of light scattering for the different air samples, and it is suggested that filtered "clean" air be used as a reference standard. (Public Health Eng. Abstracts, v. 36, Oct. 1956: 8)

521

Peterson, J. E., 1956
H. R. Hoyle, and E. J. Schneider.
THE ANALYSIS OF AIR FOR HALOGENATED HYDROCARBON CONTAMINANTS BY MEANS OF ABSORPTION ON SILICA GEL. Amer. Indus. Hyg. Assoc. Quart., v. 17, Dec. 1956: 429-433. DLC

A method is described for the analysis of air for halogenated hydrocarbons. The air contaminant is first adsorbed on silica gel, then desorbed from the gel by heating and aeration. The halogenated hydrocarbon is cracked with heat and the halogen and halogen acid is adsorbed in a solution for analysis. Such an adsorption method for the halogenated hydrocarbons has been found to be maintained quantitatively for at least a week. The method is especially satisfactory for use where an explosion hazard might exist.

522

Phair, J. J., 1956
and M. L. Thomson.
MEASURING REACTIONS TO AIR POLLUTION.
Publ. Health Rep., v. 71, Jan. 1956: 87-93.
DLC (RA11.B17, v. 71)

The methods and plan of a pilot study conducted from Jan. - Apr. 1955 in Cincinnati, Ohio, to obtain definitive data on the effects of air pollution on the health of 28 selected cardiac and respiratory patients in their homes are discussed. Automatic smoke sampling, automatic temperature and humidity recording, and sequence sampling were employed to ascertain the extent of correlation between sulfur dioxide (or total acid) and the concentration of smoke. The data recorded are being analyzed statistically. The study indicated the need for changes in various procedures and equipment, including the need for a quantitative objective method of measuring eye irritation caused by air contamination, and the need to develop simpler, more sensitive, and objective methods for the assessment of respiratory efficiency.

523

1953
PHOTOGRAPH AIR PARTICLES. Sci. News Letter, v. 64, Aug. 1, 1953: 77. DCU

A camera capable of photographing liquid or solid air particles, as small as 2/25,000 in., has been built by Stanford Research Institute scientists. With the aid of multiple exposures, fogs and other colloidal systems can be studied.

524

Pidgeon, F. D. 1954
CONTROLLING FACTORS IN IDENTIFICATION OF MICROSCOPIC CHLORIDE PARTICLES WITH SENSITIZED GELATIN FILMS. Analyt. Chem., v. 26, Nov. 1954: 1832-1835.
DLC (TP1.I615, v. 26)

An extensive investigation of the use and the limitations of the sensitized gelatin film for the identification of microscopic chloride particles included study of the effects due to variations in the preparation and thickness of the sensitized gelatin film, methods of sample collection, temperature, and examination techniques. The relation of particle size to halo size and growth and fading rates for sodium chloride are presented. (Author's abstract)

525

Pilcher, J. M. 1956
APPROACHES TO AEROSOL PROBLEMS. Battelle Tech. Rev., v. 5, Apr. 1956: 3-8.
DLC (Z7403.B35, v. 5)

Some basic information is presented on aerosols. The particle size range for some typical aerosols is given: smoke, 0.01 to 1.0 micron; fumes, 0.1 to 1.0; atmospheric fog, 5.0 to 50.0; sprays for flying insects range from 1.0 to 60.0 microns. Aerosols can be produced by dispersion of particles of solid or liquid material in a gaseous atmosphere and by supersaturating vapors to cause condensation on nuclei, thus forming small droplets. The physical stability of an aerosol depends to a considerable degree upon the rate at which the particles settle after disperion. Stokes' law for particles of 1- to 100-micron diameter provides a means for determining the rate of settling. According to this law a particle attains a steady terminal velocity of fall which is proportional to the square of the diameter. Coagulation also affects stability for when 2 liquid particles collide they may coalesce to form a larger particle which settles with a higher terminal velocity. Aerosol particles may also carry electrical charges which influence their attraction or repulsion in relation to other particles or surfaces. Thermal repulsion, or the radiometer effect, causes particles to collect preferentially on cold surfaces. Size analysis may be determined by use of an ordinary light microscope, of light-scattering techniques, or of a cascade impactor. (Quoted in part)

526

Piotrowski, J. 1955
[SPECTROPHOTOMETRIC DETERMINATION OF MIXTURES OF BENZENE AND TOLUENE VAPORS IN AIR] Spektrofotometryczna metoda oznaczania mieszanin par benzenu i toluenu w powietrzu (English and Russian summaries). Medycyna pracy, v. 6(3), 1955: 149-158. DNLM

A spectrometric method for estimating benzene and toluene mixtures in the air is described. The method is based on the colored Janovsky reaction which takes place in a solution of benzene-acetone between m-dinitrobenzene, and 2,4,6-trinitrotoluene and KOH. The maximum absorption for benzene takes place at 570-millimicron wavelength, and for toluene at 460 millimicron, which enables estimation of both compounds with great accuracy. The procedure of estimation is very simple; however, the method requires a spectrophotometer, electroabsorptionmeter or photometer with proper filters. The highest deviation in a series of 9 measurements of solutions of known concentration of both compounds was 6.8%. (Author's abstract)

527

1954
PNEUMATIC ASH CONVEYING. Utilization, v. 8, Aug. 1954: 23, illus. DLC (TP315.U85, v. 8)

"The system illustrated is an intermittent full-vacuum ash conveyor used in conjunction with a spreader stoker-fired boiler with traveling-grate ash discharge. This pneumatic system collects material from the main ash-pit hopper, stack, stoker-siftings hopper, rear-pass hopper and dust-collector hopper. The ash is transported in a closed conveyor duct from accumulation points and delivered centrifugally to a receiver-separator unit. Exhaust air from the receiver is directed through an exterior-type secondary separator for efficient separation of entrained dust. Exhaust air from the secondary separator is sent to a centrifugal air-washer unit, which sprays to wash, condense, and silence the steam introduced in the multiple-jet exhauster unit that produces the vacuum for the system. The system operates intermittently with an 80-sec conveying, and a 10-sec dumping cycle. Where the ash has a high dust content, an ash-conditioner unit is usually installed. The conditioner or dustless unloader, moistens the ash to reduce dustiness during disposal into railroad cars or trucks." (Quoted in part)

528

Policard, A., 1954
and A. Collet.
TOXIC AND FIBROSING ACTION OF SUBMICROSCOPIC PARTICLES OF AMORPHOUS SILICA. Arch. Indus. Hyg. and Occupat. Med., v. 9, May 1954: 389-395, illus. DLC (RC963.A14, v. 9)

Strongly heated silica gives off a vapor which condenses into a fine powder made up of small (less than 0.1-micron) spherical particles. Such particles were injected intratracheally and intraperitoneally into rats, and were found to be very toxic. Histopathological evidence of a "stress reaction," and of fibrosing effects was seen following the intraperitoneal injections. In general, the rats died almost immediately after intratracheal injections. The lack of fibrotic action, reported in some of the earlier literature, may be explained on the basis that the silica particles used were finer than those of the current experiments.

529

1956
POLLUTION CONTROL CAN BE WASTEFUL. Chem. and Eng. News, v. 34, June 18, 1956: 3038. illus. DLC (TP1.C35, v. 34)

According to Raymond W. Hess, a complete air pollution prevention program would impose an unbearable economic burden, and besides, could never be realized. In its place, he suggests that methods be devised that will yield minimum amounts of objectionable wastes. Such methods might possibly result in a superior product, reduce costs, and eliminate the waste treatment step. He further suggests that waste-material byproducts be recovered and converted for economic gain. Examples are given.

530

1955
POLLUTION FINE QUASHED. Chem. Week, v. 76, June 4, 1955: 42. DLC (TP1.C37, v. 76)

"The city of Buffalo, N. Y., has suffered a setback in its efforts to enforce its air-pollution-control ordinance. State Supreme Court Justice Regis O'Brien has reversed a city court conviction under that ordinance, thus quashing a $250 fine in the test case against Donner-Hanna Coke Corp. The company makes coke and coal chemicals in a plant built by the Army Ordnance Dept. in 1920, and -- according to the court's finding -- takes antipollution measures that are 'exceptional in the industry'. 'The burden was upon the city to establish the alleged violation beyond a reasonable doubt', Justice O'Brien declared. He held that the city failed to produce 'sufficient convincing evidence to sustain the conviction and fine'." (Quoted in full)

531

[1952]
POLLUTION FROM OTHER CAUSES. In California. Legislature. Assembly. Interim Committee on Air and Water Pollution. Final Summary Rep., [Sacramento], Assembly of the State of California, [1952], p. 54-69. DLC (TD425.C315)

The greasy carbonaceous smoke coming from smudge pots in orchard areas, and the odors arising from the large-scale feeding of garbage to hogs are sources of air pollution apart from the usual automotive, household, and industrial sources. Dust also has become a serious source of pollution, e.g., during the feeding of large flocks of turkeys; when carried by winds from mining waste piles and dried-up lake beds; during dust storms originating in the San Joaquin Valley (Calif.) which cause physical damage, and may act as a carrier for the fungus causing coccidioidomycosis; and during the cultivating of reclaimed land in the San Joaquin and Sacramento River (Calif.) deltas which results in dust clouds of fine, irritating peat particles.

532

1955
POLLUTION MONITOR. Chem. Week, v. 77, Nov. 12, 1955: 70, 72. DLC (TP1.C37, v. 77)

"A new oxidant recorder, developed by Stanford Research Institute, is in production at Beckman Instruments, Inc. (Fullerton, Calif). The instrument determines the concentrations of atmospheric oxidants by colorimetric measurement of their effect on a buffered potassium-iodine solution. It covers the range 0-80 parts/hundred million (accurate to 2 pphm) ozone equivalent, recording measurements on a strip-chart recorder." (Quoted in full)

533

1957
PORTABLE AEROSOL GENERATOR. Research Reviews (Office of Naval Research, Washington), Jan. 1957: 12-13, illus.
DLC (Q180.U5A335, 1957)

The Naval Research Laboratory (Washington) has developed a special portable aerosol generator to facilitate its investigations of ventilating and air-cleaning systems. The generator weighs 10 lb, occupies 3 cu ft of space, operates on compressed air at 5 lb pressure, and provides a polydisperse aerosol at a rate of 40 l/min from either liquids or suspensions. Although it can be used regularly in the laboratory, its light weight and ease of operation make it especially suitable for field use in testing certain types of filters or in studies of air currents.

534

1956
PORTABLE FLUE GAS ANALYZER. Air Conditioning, Heating, and Ventilating, v. 53, Jan. 1956: 105. DLC (TH7201.H4, v. 53)

A new model portable instrument (12 lb) for measuring the carbon dioxide in flue gas... has a range from 0 to 20% carbon dioxide with a 2% meter. The analyzer draws a sample of gas from the flue, and properly conditions it through a filter and flow indicator. The sample of gas than passes through a pump, and into a thermal conductivity analyzer cell which electrically detects the carbon dioxide. (Quoted in part)

535

Poste, E. P. 1955
TWENTY YEARS OF AIR POLLUTION CONTROL IN CHATTANOOGA. Air Repair, v. 4, Feb. 1955: 210-212, illus. DLC

Chattanooga, Tenn. is an industrial city with a topography and climatology which tend to intensify the effects of air pollution resulting from the improper burning of fuels and from fumes incidental to certain manufacturing operations. Although the Bureau of Air Pollution Control and Boiler Inspection has had a slow growth and is still inadequate, because of the lack of available funds, considerable progress has been made under its supervision. Atmospheric conditions have been improved as judged by visual observation and by dustfall determinations over a considerable period of time. This improvement has come about largely through the installation of mechanical firing devices and equipment for arresting fly ash and dust, through conversion to diesel engines by the railroads, and through the rapidly expanding use of electric heating. Recent airborne dust tests afford useful information as to the intensity of pollution at several important locations. These test results compare favorably with those recorded in the literature for other industrial communities. (Author's abstract)

536

Pratt, C. J. 1955
A GUIDE TO INDUSTRIAL FILTRATION. I. Indus. Chemist, v. 31, Sept. 1955: 452-454. DLC (TP1.I62, v. 31)

The history and theory of the separation of solids from liquids by filtration are discussed. The basis for the operation is the flow of the liquid through a capillary, the flow varying to the 4th degree as the radius of the capillary increases. Since the preparation of the slurry before filtration may determine the efficiency of the filtration, several methods and their particular applications are given. The applications for 2 of the methods are diagrammed.

537

Pratt, C. J. 1955
A GUIDE TO INDUSTRIAL FILTRATION. II. Indus. Chemist, v. 31, Dec. 1955: 607-613. DLC (TP1.I62, v. 31)

The choice of filtration equipment is dependent upon these factors: (1) the operation to be performed; (2) the magnitude of the operation; and (3) the economics of the operation. There are 4 main classes of industrial filtration equipment, each of which may be divided into 2 or more types of filters applicable to particular performances. Typical industrial filter applications are tabulated in detail.

538

Pratt, D. C. F., 1955
and A. Rutherford.
REMOVAL OF HYDROGEN SULPHIDE FROM EXHAUST AIR FROM A VISCOSE STAPLE FIBRE FACTORY. Chem. and Indus., no. 41, Oct. 8, 1955: 1281-1286. DLC (TP1.S6332, no. 41)

About 500,000 cu ft of gas are exhausted from a viscose staple fiber plant every min, containing 800 ppm and 300 ppm of carbon disulfide and hydrogen sulfide, respectively. A spray-type scrubbing tower has been designed to reduce the hydrogen sulfide to 10-20 ppm, and to remove about 50-70 ppm of carbon disulfide. Within the 24 ft of effective scrubbing height, 192 jets are arranged in 12 layers of 16 jets each. The liquor from the tower is channeled into a deep regeneration tank, and the sulfur scum is removed to a sulfur recovery drain. The process involves scrubbing the contaminated gases with an alkaline solution containing a suspension of hydrated ferric oxide.

539

Pratt, P. C. 1954
THE DETERMINATION OF THE TOTAL WEIGHT OF SILICA, AND ITS CORRELATION WITH TISSUE REACTION, IN THE LUNGS OF EXPERIMENTAL ANIMALS. Amer. Jour. Pathol., v. 30, Sept.-Oct. 1954: 1003-1009, illus. DLC (RB1.A4, v. 30)

A method is described by which the weight of silica, or other components, in pulmonary tissue can be calculated and correlated with microscopic pathology. By animal experiments, it was shown that the correlation between silica content on a weight basis and tissue reaction was far better than the correlation between silica content on a percentage basis and tissue reaction. Little individual variation among experimental animals within a given species was found in the susceptibility of the tissue to toxic effects of inhaled quartz dust; there was, however, a substantial individual variation in the rate of accumulation of the inhaled dust even in animals exposed to the same dust under identical conditions.

540

1955

PRECIPITATOR FOR AEROSOL SAMPLING. Analyt. Chem., v. 27, Feb. 1955: 54A, illus.
DLC (TP1.I615, v. 27)

"The Konisampler, a compact thermal precipitator for aerosol sampling, is available from Joseph B. Ficklen. It can be used for air-pollution surveys, control of dust and fume exposures, optical examination of particulate matter, sampling for electron microscopy, and other micrometric problems. The instrument collects dust, smokes, fog, fumes, and other particulate matter at sampling rates as high as 50 cc/min, with 100% efficiency claimed. Samples are collected on 1- by 3-in. microslides or other suitable surfaces, and can be used for visual, optical, electron microscopic, chemical, and spectrographic analyses. The sampling head of the Konisampler is detachable and may be placed in a remote location. A timer can be used to cut off the instrument, eliminating the need for attendance." (Quoted in full)

541

Preston, R. St. J., 1956
and B. Sanyal.
ATMOSPHERIC CORROSION BY NUCLEI. Jour. Appl. Chem., v. 6, Jan. 1956: 26-44.
DLC (TP1.S612, v. 6)

Bare and varnished steels which are contaminated by nuclei produce, in humid atmospheres, the type of corrosion characterized by filamental configuration known as filiform. With some nuclei, corrosion takes place at relative humidities below 60%. Filiform corrosion is characteristic of, and the primary phase in, electrolytic corrosion in atmospheric conditions, but the rate of attack varies from one electrolyte to another and with the degree of humidity. In several cases, corrosion attack has been found to be greater at 70% relative humidity than at 99% relative humidity. The presence of highly hygroscopic salts in the atmosphere can initiate corrosion, even at low relative humidities. Nuclei on the outside of a varnish film will generally start corrosion earlier than those beneath the film, especially if water is present on the surface. Corrosion data are presented and analyzed for tests of the following contaminants on coated or uncoated steel: sodium chloride; calcium sulfate; ammonium sulfate; sodium nitrate; zinc chromate; flux for welding cast iron; flue dust; cinder; iron oxide (pigment quality); carborundum (FFF grade); ferric chloride; calcium chloride; ferrous chloride; magnesium sulfate; sodium sulfate; lithium chloride; ferric sulfate; sodium acetate; ammonium nitrate; and ammonium acetate. (Authors' abstract in part)

542

Price, T. D., 1955
and H. Klemperer.
EVALUATION OF THE MULTIPLE SPOT DISCOLORATION TESTER. Air Repair, v. 4, Feb. 1955: 213-216. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The tester is a device for determining the efficiency of electrostatic filtering equipment by the discoloration method. It consists of 4 testers built into one unit, using equal paper areas and constant sampling time for the tests. The construction and operation of the apparatus, and results obtained in experimental work on high temperature flue-gas cleaning equipment are discussed. The advantages of the tester are listed as follows: (1) Avoids trial-and-error manipulation; (2) eliminates subjective judgment; (3) provides equal velocity (avoiding differences in the efficiency of paper owing to varying velocities); (4) provides a representative sample; (5) provides a statistical advantage by giving several spots for comparison; (6) immediate approximation of the efficiency range may be made visually; and (7) results are presented on a single piece of paper.

543

Pring, J. N. 1952
and G. M. Westrip.
ELECTROMETRIC DETERMINATION OF OZONE AT HIGH DILUTIONS. Nature, v. 170, Sept. 27, 1952: 530-531. DLC (Q1.N2, v. 170)

Extensive laboratory tests have shown that an electrometric technique provides a highly sensitive method which can be applied to the determination of atmospheric concentrations of ozone by means of a readily portable apparatus. Equations, theoretical considerations, and some typical laboratory measurements are given.

544

Pring, J. N. 1955
THE ESTIMATION OF OZONE AT HIGH DILUTIONS BY ELECTROMETRIC AND COLORIMETRIC METHODS. Jour. Appl. Chem., v. 5, July 1955: 338-347. DA

A method is described for the determination of ozone at high dilutions (10^{-5} to 10^{-8} l ozone/l air), which can be adapted to give continuous and self-registering records. The method is based on the oxidation potential of a bromine-hydrobromic acid electrode, which is not affected by the oxides of nitrogen or other oxidizing substances in the concentrations occurring in the atmosphere. Complete absorption of the ozone by the reagent is not necessary, and the method is independent of the total volume of air passed. The results are compared with the color changes given by potassium iodide-starch papers, and with potential measurements from the oxidation of aqueous sulfuric acid to persulfuric acid. This system is considered suitable for use in air tests at isolated stations such as in polar and mountain regions and on board weather ships.

545

Pring, R. T. 1954

FILTRATION OF HOT GASES. Air Repair, v. 4, May 1954: 40-45. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The use of synthetic fabrics for baghouse filters is discussed. Orlon and Fiberglas fabrics are suitable for continuous use at temperatures of 275°F and 400° to 450°F, respectively. Nylon, Vinyon, and possible Teflon, because of their resistance to certain chemicals (alkaline materials, chlorides, and fluorides) find applications at lower temperatures. Methods of cooling gases are compared. Data on the performance of Orlon and Fiberglas filter bags in cleaning gases from gray iron foundries, open hearth steel furnace gases, and ventilation air from electric furnaces are presented.

546

1956

PROCESS CLEANS AIR. Air Conditioning, Heating, and Ventilating, v. 53, Jan. 1956: 100. DLC (TH7201.H4, v. 53)

"A process called ultrafiltration . . . involves the charging of [cloth] filter bags with a filter aid which precoats the filtering surfaces and provides a matrix upon which the fine particles of atmospheric dust and tarry matter are collected. One application of the filter aid will last from 2 to 3 yr under normal conditions. Since shaking the spent filter aid and accumulated dust from the filter bags comprizes the only maintenance of the filter required, maintenance costs are limited to cleaning and recharging the collector. In one operating installation having a design volume of 720,000 cu ft/min of city air, the process reduced the dust content of the air from 5.21 to 0.04 mg/1000 cu ft. The figures are average values over a period of 1 yr." (Quoted in part)

547

Prokopovich, N. 1954

DUST-SNOW STORM IN THE MINNEAPOLIS-ST. PAUL AREA ON 12 MARCH 1954. Science, v. 120, Aug. 6, 1954: 230-231. DCU

The dust-snow storm is described. Dust collected was examined by x-ray methods, revealing the presence of quartz and feldspar. The dust contained about 0.5% lipoid, by weight. A sample of snow contained 2.98 g of dust/l of snow. If this sample is representative, it indicates that 128.8 tons of dust/sq mi settled on the Twin-Cities region during the storm.

548

1955

PUBLIC AND PRIVATE. Chem. Week, v. 76, June 18, 1955: 34. DLC (TP1.C37, v. 76)

"Legal actions against alleged sources of pollution are being pushed this week by both public and private parties: At Oakland, Calif., Pacific Gas & Electric Co. is asking for damages and an injunction against Best Fertilizer Co., charging that corrosive substances from Best's stacks have damaged power lines and transformers. At Niagara Falls, N. Y., city officials are investigating an 'odor nuisance' near the Pathfinder Chemical plant, and are hinting that court action may follow." (Quoted in full)

549

1956

PUBLIC PROVOKES AIR POLLUTION. Chem. and Eng. News, v. 34, Apr. 9, 1956: 1697-1698. DLC (TP1.C35, v. 34)

At the American Power Conference in Chicago, F. S. Mallette said that the public is responsible for much of the air pollution. Sources include grate fires in London, and automobile exhaust gases and backyard trash burners in Los Angeles. Public reaction in 1955 to a proposed ban on backyard trash burners in Los Angeles resulted in the county supervisors setting a compliance deadline of Oct. 1957. It was noted that industry has done proportionately more to abate pollution than has the public, but still has much to do especially in view of anticipated restrictive legislation and expenditures for abatement equipment. In addition, W. L. Faith discussed the question "Where does the responsibility lie to initiate and finance the necessary [air pollution] research?"

550

Quebedeaux, W. A. 1954

NEW APPLICATIONS FOR INDUSTRIAL ODOR CONTROL. Air Repair, v. 4, Nov. 1954: 141-142, 170-171. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Principles of odor abatement must be learned chiefly by trial and error because of the lack of adequate methods of odor analysis. Factors related to the industrial odor problem include the physical state of the materials producing the odor, the concentrations of the materials responsible for odor, and the presence of particulate matter which may carry the odor a long distance. Masking agents and odor counteractants are used in the solution of many odor problems. Space spraying to treat odors in areas outside industrial plants is a new technique. Best results are obtained when the material is applied so that it can cover a broad area. (Public Health Eng. Abstracts, v. 35, Mar. 1955: 2)

551

Quebedeaux, W. A. 1955

POLLUTION CONTROL IN HARRIS COUNTY, TEXAS. Oklahoma Agric. and Mech. College, Stillwater. Eng. Exper. Sta. Publ., v. 23, Dec. 1955: 63-73 (no. 97) (Paper presented to the Industrial Wastes Conference of Oklahoma Water, Sewage and Industrial Wastes Conference, Stillwater, Oct. 5 and 6, 1955) DBS

Air pollution in small areas downwind of industrial plants located along the Houston Ship Canal (Harris County, Tex.) has caused damage to vegetation and health. The geographical features and the uncertain weather of the area often result in sudden and rapid descent of pollutants. Therefore, the movement of the industrial haze as it proceeds inland is reported by the city weather bureau. In Harris County no maximum allowable concentration for contaminants in stacks has been set by state officials; instead only that amount which does not give undue discomfort to local residents is allowed. The Stream and Air Pollution Control Section of the State Department of Health: confers with local industries to determine their progress towards eventual air-pollution abatement; periodically samples the air; investigates and records air pollution complaints; issues abatement notices; and files complaints under civil or penal statutes when abatement is not accomplished. The pollutants at Houston include: hydrogen sulfide and mercaptans; chemical fumes such as sulfuric acid; phosphoric acid fog, hydrochloric acid; and contaminants from burning refuse piles, and waste oil burning pits. Coal dust is not a problem. Various air pollution conditions which have been remedied, and statistics concerning legal actions are listed.

552

Quiram, E. R., 1954
S. J. Metro, and J. B. Lewis.
DETERMINATION OF HYDROCARBON GASES AS AIR CONTAMINANTS. Analyt. Chem., v. 26, Feb. 1954: 352-354. DLC (TP1.I615, v. 26)

A simple method has been developed for the determination of small quantities of gaseous hydrocarbons in the atmosphere. These gases are concentrated by adsorption on silica gel at -100°F, desorbed into an evacuated gas-sampling container or bomb, and analyzed by a mass spectrometer. Synthetic mixtures containing various saturated and unsaturated hydrocarbons ranging in volume from 0.08 to 0.317, were blended with sulfur compounds, carbon monoxide, and nitrogen for standards. Approximately 95% recovery of C_3, C_4, and C_5 hydrocarbons was obtained, while the recovery of ethane was only 60%. The method is also capable of showing the presence of hydrocarbons in low concentrations, as found by analyzing a sample of air collected near a refinery still. In this case, the hydrocarbons detected consisted of methane, propane, and isopentane and ranged from 3 to 8 ppm. This list represents only a small fraction of the hydrocarbons which may be captured in the vicinity of ordinary refineries. (Authors' abstract)

553

Radecke, F. 1955
BASIC ESSENTIALS FOR THE REDUCTION OF ATMOSPHERIC CORROSION. Corrosion, v. 11, Oct. 1955: 437t-441t. DLC (TA462.C65, v. 11)

A 4-phase plan used by a refinery to reduce atmospheric corrosion through the improvement of exterior coating protection is described. Included is a discussion of factors to be considered in setting up a maintenance painting program. It was found that paint engineers are concerned primarily with 4 matters: (1) selection of paint with respect to environmental severity; (2) surface preparation; (3) dry film thickness; and (4) number of coats to be applied. A plant specification standard prepared by an oil company is given. (Author's abstract)

554

Radler, D. H. 1955
LEARNING WHY NOSES KNOW. Sci. News Letter, v. 68, Dec. 10, 1955: 378-379. DBS

An odor meter, developed in 1950 at Purdue U., detects the presence of air contamination by measuring changes in the surface tension of a drop of the pollutant. Contaminations almost too weak to reach the smell threshold are detected for a limited number of odors. A more sensitive electrical tester, which detects air contaminations by changes produced in surface potential, is being developed. For camphor and alcohol, contaminations as low as 0.1 ppm of air have been detected. Cannery wastes are analyzed with a chemical device "to tell exactly how bad products smell," and to predict when the odor from waste lagoons will become unpleasant. Methods developed to test the effectiveness of various cannery odor-masking systems can be applied to other industrial wastes.

555

Ramanathan, K. R., 1953
and V. R. Murthy.
DAILY VARIATION OF AMOUNT OF OZONE IN THE ATMOSPHERE. Nature, v. 172, Oct. 3, 1953: 633-634. DLC (Q1.N2, v. 172)

Spectrophotometric observations, using either sunlight or moonlight and made at Mount Abu and Ahmedabad (India) in the period of Nov. 1952-Apr. 1953, show clearly that there is a substantial increase in atmospheric ozone during night-hours as compared to day-hours. The increase of ozone from the day value to the night value takes place within an hour after sunset. The change from night to day value after sunrise is also rapid. These indicate that the seat of the observed changes is high up in the atmosphere, where the recombination of oxygen atoms and molecules to form ozone after sunset, and the photolysis of ozone at sunrise are very rapid. Although these observations were intentionally made at low latitudes, it may be expected that these daily variations of ozone extend to higher latitudes. (Authors' abstract in part)

556

1955
RECOMMENDED STANDARD METHOD FOR CONTINUING DUSTFALL SURVEY (APM 1-A). Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 176-181, illus. DLC

In this tentative report prepared by the Committee on Air Pollution Measurement of the Air Pollution Control Association, a standard method for measuring the average rate of dustfall over a large area is presented. The dust collector suggested as an interim specification because of the lack of sufficient aerodynamic data is an open-top stainless steel or glass cylinder with vertical sides, 5 in. diameter. Suggestions are also made for classification of the area; selection and maintenance of the site; length of sampling period; collection and analysis; reporting and interpretation of the data; and recommendations for future work. An appendix gives a suggested standard statistical method, and an illustrative case. Some comments of the Committee are given in answer to a critical review of the report by members of the Technical Coordinating Committee.

557

1956

RECORDING SPECTROPHOTOMETER. Instrument Rev., v. 3, Mar. 1956: 53-54. DLC

A variation of the quartz spectrophotometer has been developed to record frequency and optical density automatically. Light sources include a hydrogen lamp with a quartz envelope, a tungsten lamp, and for special purposes, an infrared transmitting window. Cells applicable to various wavelength readings or different types of samples are suggested.

558

Reed, R. D. 1954

SMOKELESS BURNING OF WASTE PROCESS GASES. Trans. Amer. Soc. Mech. Engineers, v. 76, Feb. 1954: 251-253. DLC (TJ1.A7, v. 76)

A knowledge of the theory of combustion is essential to provide smokeless burning. It is stated that the amount of smoke produced in burning is directly proportional to the wt-%-ratio of hydrogen to oxygen. Three methods of attaining blue-flame burning, which does not produce smoke, are:

(1) Premixture with large volumes of air;
(2) high-velocity gas discharge; and
(3) presence of steam as the gas burns.

This latter method has been selected by most plants, but it too presents problems, which are discussed in the paper.

559

Reed, R. J., 1954
and S. M. Truitt.

SELECTING INCINERATOR SMOKE AND ODOR BURNERS. Air Repair, v. 4, Nov. 1954: 109-117. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

A method of controlling smoke and odor emission from flue-fed incinerators commonly used in apartment buildings is considered. Air and high temperature are provided simultaneously for ignition of the smoke and gases. Descriptions of auxiliary burners for these purposes are given, and the conditions determining the selection and location of burners are discussed. Installations in New York City and Los Angeles, Calif. are described.

560

Rees, R. L. 1953

THE REMOVAL OF OXIDES OF SULPHUR FROM FLUE GASES. Jour. Inst. Fuel, v. 25, Mar. 1953: 350-357, illus. DLC (TP315.I6, v. 25)

The historical development of flue-gas washing at power stations is presented. Modern knowledge concerning the effects of sulfur dioxide upon men and plants has yielded no evidence for the thesis that ordinary flue gas, discharged hot and at reasonably high speeds from well-designed chimneys, is harmful to health and agriculture; on the other hand, washing the flue gas opposes the good effect of a tall chimney by cooling the gas, so that washing may actually increase the local pollution under certain weather conditions. It is calculated that existing gas-washing processes, which are described briefly, cost more than the damage done by the sulfur dioxide they remove. These processes are wasteful in that no useful material is recovered from the flue gas. The world shortage of sulfur has given a new impetus to the problem of devising new processes for the recovery of sulfur or its compounds from flue gas; the use of gas liquor for the manufacture of ammonium sulfate from flue gas, which is being investigated in pilot plants, may provide a limited solution to the problem, applicable at stations which are located so that cooling of the flue gas is not objectionable, even when the fuel is rich in sulfur. (Author's abstract)

561

Regener, V. H. 1952

ATMOSPHERIC OZONE. In Physics and medicine of the upper atmosphere: a study of the aeropause. Ed. by C. S. White, and others. Albuquerque, University of New Mexico Press, 1952, p. 109-122. DLC (RC1050. U5)

The altitude, density, thickness, and physical characteristics of the ozone layer in the earth's atmosphere are briefly described. Toxic effects may be expected in the vicinity of 80,000 ft above sea level. However, the design of protective equipment (filters containing ozone-destroying materials) should be relatively simple. The destructive action of ozone on rubber deserves special attention.

562

Reif, A. E., 1956
C. S. White, and M. E. Giblin.

AEROSOL PRODUCTION AND SIZE ANALYSIS WITH THE ROLLER SEPARATOR. Arch. Indus. Health, v. 14, Nov. 1956: 442-449, illus. DLC (RC963.A14, v. 14)

The operating characteristics of the Roller separator have been investigated, with special emphasis on the production of aerosols under 10 microns in unit density diameter. The size range of particles separating at constant flow rate increased with decreasing particle size, and was relatively wide for particles under 10 microns. The rate of separation of such particles was much slower than for larger size particles, probably because of the tenacious formation of aggregates. For the materials studied, the mean size of fractions under 5 microns in diameter increased significantly in the course of Roller separation at constant airflow rate. The size separation obtained with the Roller separator was in approximate agreement with Stokes' law. (Authors' abstract)

563

Rendle, L. K., 1956
and R. D. Wilsdon.
THE PREVENTION OF ACID CONDENSATION IN OIL-FIRED BOILERS. Jour. Inst. Fuel, v. 29, Sept. 1956: 372-380, illus.
DLC (TP315.I6, v. 29)

The presence of sulfur in fuel oils causes a considerable rise in the dew-point of the flue gases. In order to avoid corrosion of heat-exchanger surfaces, it is the general practice to maintain these at temperatures above the acid dewpoint, with a consequent loss of thermal efficiency over that obtainable in the absence of sulfur. The effect of the sulfur contents of several residual and distillate fuel oils on the dewpoints and sulfur trioxide contents of the combustion gases has been investigated in an experimental refractory-lined furnace. To increase the scope of the tests the sulfur contents of 4 of the oils were increased by the addition of oil-soluble organic sulfur compounds. It was found that the dewpoint results together with other published data could be represented satisfactorily by 1 curve. At 25% excess air the dewpoint of the flue gases from a sulfur-free fuel is 45°C., while for a fuel of 1% weight sulfur content the dewpoint is about 130°C. In the range of fuel-sulfur-content from 1 to 5% weight, the dewpoint increases by approximately 4°C for each 1% weight rise in sulfur content. A number of materials, including silicas, carbon, oil-soluble metallic soaps, metallic oxides, a metal dust, and ammonia have been assessed in the experimental furnace as flue-gas dewpoint depressants when burning residual fuel oil containing 3.2 to 3.4% weight of sulfur. The injection of ammonia into the combustion gases at a temperature of about 300°C, and at a concentration of 0.06% weight on fuel was the most efficient and economical method of eliminating the acid dewpoint, and of reducing the corrosion of exposed steel surfaces to a negligible level. (Authors' abstract)

564

Renzetti, N. A., 1956
and J. C. Romanovsky.
COMPARATIVE STUDY OF OXIDANTS IN THE LOS ANGELES ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 154-159, illus. (Paper presented at the 49th Annual Meeting of the Air Pollution Control Association, Buffalo, N. Y., May 20-24, 1956) DLC

This analysis of Los Angeles, Calif., smog discusses its primary manifestation, the presence of oxidant. Because, in addition to an oxidant such as ozone, the air may also contain a reducing agent such as sulfur dioxide, it is necessary to know whether the results are expressed as net oxidants or total oxidants. In these data, the chemical methods of analysis give a net oxidant. Under the present conditions in the Los Angeles Basin, this uncorrected net value is said to correlate well with smog severity. In Los Angeles also, ozone is the only oxidant which has been well identified, the others having been either postulated or suspected to exist. The potassium iodide recorder indicates oxidant in the atmosphere by the liberation of iodine from a buffered neutral potassium iodide solution. Another method depends upon the oxidation of phenolphthalin to phenophthalein by the oxidant of the atmosphere. Atmospheric concentrations of ozone are also measured by noting the time required for initial cracking of a calibrated strip of rubber held under tension. An ozone ultraviolet spectrometer gives ozone concentrations in the air, using as a standard the ratios between midnight and 4:00 a.m. as essentially zero. It is suggested that in monitoring smog, a device not responsive to ozone be used in order to establish its correlation with eye irritation and plant damage. Some suggested techniques are presented in footnotes.

565

Renzetti, N. A., 1956
and J. C. Romanovsky.
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE. Arch. Indus. Health, v. 14, Nov. 1956: 458-467.
DLC (RC963.A14, v. 14)

The responses of potassium iodide and rubber cracking to Los Angeles smog in Pasadena, Calif. are essentially the same when their calibrations are derived by an oxone-in-air stream. The response of phenolphthalin is also the same if definitive laboratory calibrations with ozone establish the ratio of 2 for phenolphthalin to 2% potassium iodide as used in this study. These chemical systems respond to other oxidants in addition to ozone in the smog, as judged by the ozone concentrations derived from ultraviolet absorption spectrometry. These other oxidants reach 10-40 pphm concentrations for ozone values above 20 pphm. When the reagent phenolphthalin, calibrated with H_2O_2, is used as an indicator of ozone concentration, a correction factor should be established empirically for the particular instrumental arrangement used in sampling. It is expected that this factor will lie between 2 and 3. (Authors' abstract)

566

Rice, E. W. 1952
IMPROVED PHOTOMETRIC DETERMINATION OF CARBON MONOXIDE BY MEANS OF PALLADIOUS CHLORIDE. Arch. Indus. Hyg. and Occupat. Med., v. 6, Dec. 1952: 487-490.
DLC (RC963.A14, v. 6)

Details are given for a method for detection and determination of carbon monoxide involving reduction of palladious chloride in which the palladium can be estimated spectrophotometrically, instead of colorimetrically, as palladious iodide. This method was devised as a test for the toxicological determination of carbon monoxide.

567

Richards, L. M. 1956
THE FORMATION OF OZONE IN POLLUTED ATMOSPHERES. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 216-218, 246, illus. (Paper presented at a session on Smoke and Fumes during the 20th Midyear Meeting of the American Petroleum Institute's Division of Refining, St. Louis, Mo., May 10, 1955) DLC

Nitrogen dioxide has been shown to be formed during the irradiation of polluted air when [oxidant] precursors are present, presumably from nitric oxide or organic nitrogen compounds. The photolysis of nitrogen dioxide in the presence of organics produces oxidants believed to be largely ozone. The organics probably assist the formation of ozone by reacting to give free radicals which remove the nitric oxide as an organic derivative or rapidly oxidize it back to nitrogen dioxide. Further experiments must be designed to permit a choice of the many possibilities. (Author's abstract)

568

Richards, S. H. 1952
SURVEY OF THE CONCENTRATION OF SULPHUR DIOXIDE IN THE AIR OF SOUTHWEST LONDON: A FIRST APPRAISAL OF RESULTS. Jour. Inst. Fuel, v. 25, Nov. 1952: 261-266, 276.
DLC (TP315.I6, v. 25)

This survey was designed to study the effects of the post-war restarting of flue-gas washing at Fulham and Battersea (London) electricity generating stations on the pollution of the nearby air with sulfur dioxide. During the period of the survey (1945-1950), however, none of the gas from Fulham, and only part of that from Battersea has been treated; at the same time there has been an increase in the fuel consumption at these stations. In consequence, the reduction in the sulfur dioxide emission of the stations has been small in relation to the total emission in the area. Estimations of sulfur dioxide were made by the lead peroxide method at 30 sites, situated at distances up to 4 miles from the stations; the persistent patterns of summer and winter pollution thus disclosed have been included on "contour" maps. (Author's abstract)

569

Richardson, H. L. 1956
SCOPE OF THE FURNACE FUME CONTROL PROBLEM. Iron and Steel Engineer, v. 33, Jan. 1956: 105-111, illus. DLC (TS300.I63, v. 33)

General aspects of the problems of gas cleaning in the steel industry are considered. The materials carried in suspension in the gases from the treatment of iron after it leaves the blast furnace are not sufficiently valuable to warrant their recovery; hence, the control of air pollution almost uniformly requires added capital and maintenance costs without economic return. In solving the problem, it must be remembered that pollution control is no longer purely a plant problem, but that there is a trend toward more rigid, outside-the-plant control by ordinance. More and more emphasis is being placed on removal of the fine as well as the coarse material since it is the fine particles, even though representing a minor portion of the total weight of solids being discharged to the atmosphere, which furnish visually practically all of the material which causes light scattering. Basically there are 5 types of gas cleaning equipment available: settling chambers, filters, scrubbers, inertial collectors, and electrical precipitators. Some of the problems involved in their use for gas cleaning in the steel industry are discussed.

570

Richardson, J. F., 1954
and W. N. Zaki.
THE SEDIMENTATION OF A SUSPENSION OF UNIFORM SPHERES UNDER CONDITIONS OF VISCOUS FLOW. Chem. Eng. Sci., v. 3, Apr. 1954: 65-73. DLC (TP1.C366, v. 3)

An expression for the theoretical drag force on a uniform spherical particle settling in a fluid has been derived and is presented. Two particle configurations are considered assuming that each particle is situated within a hexagonal area of fluid. It is suggested that the hexagonal areas are separated, in vertical layers or adjacent horizontal layers, by a distance equal to that between particles in adjacent hexagonal areas. Mathematical expressions are derived for the factors influencing sedimentation.

571

Riehl, W. A., 1955
and K. F. Hager.
RAPID DETECTION OF ANILINE VAPORS IN AIR. Analyt. Chem., v. 27, Nov. 1955: 1768-1769. DLC (TP1.I615, v. 27)

Aniline vapor in concentrations above 5 ppm (by volume) in air is known to be toxic. The concentration of aniline vapor in the air can be determined easily and rapidly by use of paper strips impregnated with the liquid or vapor of a furfural-acetic acid mixture (4%, by volume, in glacial acetic acid). The test paper turns from white to pink or red in the presence of aniline vapor, having a range of determination from 5 to approximately 150 ppm. The speed and intensity of color development increases with the concentration of aniline vapors. The test is specific for aniline in the presence of many others organic vapors. The reagent mixture has a life of at least 1 month at room temperature. (Authors' abstract)

572

Roberts, M. L. 1955
RELATIONSHIP OF PARTICLE COUNT, WEIGHT, SHAPE, AND SIZE OF AIRBORNE DUSTS. Arch. Indus. Health, v. 12, Sept. 1955: 361-367, illus. DLC (RC963. A14, v. 12)

A dusty atmosphere was created experimentally, using quartz particles (where 88-95% of the airborne particles were smaller than 5 microns when seen at a magnification of 1000 times) and several varieties of submicron amorphous silica dusts. Values representing the average particle size of the quartz dust on a count basis and on a weight basis, although different, were of the same order of magnitude. Large differences were noted in the values representing the average size of particles of submicron amorphous silica dust and of aggregate on a count basis and on a weight basis, indicating the unsuitability of the midget impinger and light-field counting technique for the counting and measuring of the submicron dust.

573

Robinson, E. 1956
A WIND-DIRECTION, CONTROLLED AIR SAMPLER. Arch. Indus. Health, v. 14, Aug. 1956: 154-157, illus. DLC (RC963. A14, v. 14)

A directional air sampler, for the sampling of gaseous and fine particulate material with the use of filters and liquid scrubbers, is illustrated and described in detail. The device made it possible to determine concentrations of materials as a function of wind direction in an area where the prevailing winds could be easily divided into two 180° sectors, and where electric power was not available. The units are self-contained through the use of a gasoline motor-driven pump, and a battery-operated valve and valve-switching mechanism. The assembled unit is simple and rugged, and can be easily moved and set up for field operations. (Author's abstract in part)

574

Rogers, L. W., 1956
N. A. Renzetti, and M. Neiburger.
SMOG EFFECTS AND CHEMICAL ANALYSIS OF THE LOS ANGELES ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 165-170, illus. (Paper presented at the 128th National American Chemical Society Meeting, Minneapolis, Minn., Sept. 11-16, 1955) DLC

Smog as manifested by high average oxidant concentration occurs throughout the Los Angeles Basin, Calif. Attacks were consistently most severe in Pasadena, Azusa, and downtown Los Angeles; next in severity were the Wilshire district, Burbank, Rivera, and Bassett; and least were Venice, Dominguez, and Artesia. Smog as manifested by human eye irritation occurred throughout the Los Angeles Basin, with the maximum in Burbank and Pasadena. Severity of eye irritation increased as oxidant increased for values of the latter above 10 pphm. The measurement of oxidant concentration constitutes the best available objective indicator of the severity of smog. Line of equal oxidant and eye irritation values resemble contour lines on a topographic map. Typical air streams crossing these contours from the ocean to the foothills go from low to high values, apparently corresponding to the length of time the air has spent over source areas, the number and strength of pollutant sources encountered on the way, and the amount of insolation the air has experienced. These indicators are broadly consistent with the laboratory findings of earlier investigators of photochemical oxidative reactions. Smog as manifested by damage to plants occurred throughout the Basin. It occurred in 80 to 88% of the days of this survey when normal experimental conditions existed. The correlation between the injury index, or quantitative estimate of damage, and oxidant is below the level of significance. The % of plants damaged, or the qualitative estimate of injury, however, is correlated significantly with oxidant. (Authors' abstract in part)

575

Roper, G. H. 1955
ABSORPTION OF CARBON DIOXIDE BY CARBONATE SOLUTIONS IN A DISC COLUMN. Chem. Eng. Sci., v. 4, Dec. 1955: 255-264. DLC (TP1. C366, v. 4)

The absorption of carbon dioxide by carbonate solutions in disc columns, consisting of 31 discs arranged perpendicularly to each other in a glass column, was compared to similar absorption in packed towers. The absorption of carbon dioxide in sodium carbonate and potassium carbonate was measured at liquor rates of 34 - 415 lb/(hr)(ft) by the change in concentration of the liquor in a reservoir cylinder. The results of the absorption in the 2 solutions are tabulated; the factors, such as liquor rate, temperature, and total concentration, are plotted against the absorption coefficient.

576

Rose, H. E. 1952
DETERMINATION OF THE "EXTINCTION COEFFICIENT" — PARTICLE SIZE RELATIONSHIP FOR SPHERICAL BODIES. Jour. Appl. Chem., v. 2, Feb. 1952: 80-88, illus. DLC (TP1. S612, v. 2)

A description is given of an experimental investigation into the extinction coefficient—particle size relationship for small spherical particles: glass, sand, flue dust (fuzed particles and aggregate), and coal. An accurate knowledge of this relationship is essential if the photo-extinction method of powder-size analysis is to be applied with the highest accuracy of which the technique is capable; an insufficient knowledge of this relationship is probably responsible for the introduction of the large margin of uncertainty presently encountered in the application of the method. An effort has been made to eliminate the errors usually introduced into the experimental determination of this relationship; the experimental curve is in good agreement with the limited theoretical results available. (Author's abstract)

577

Rosinski, J., 1956
H. E. Glaess, and C. R. McCully.
PARTICLE SIZE DISTRIBUTION AND NUMBERS OF PARTICLES PER UNIT MASS OF SOME FLUORESCENT POWDERS. Analyt. Chem., v. 28, Apr. 1956: 486-490, illus.
DLC (TP1.I615, v. 28)

Fluorescent fine particles, dispersed by low-flying aircraft, were used as a tracer in studies of washout of particulate matter by rain. The particle size distribution and number of particles/unit mass were determined by conventional means which appear to be unsatisfactory. New dilution-microscopic and dilution-photometric methods were developed. Equations for size distributions of different tracers were calculated, and the results of analyses were compared. Whenever collected particles must be sized and counted, the dilution-microscopic method should be used to classify the tracer; if the size distribution of the sample is known, the rapid photometric method can be used to obtain the total number of particles. (Authors' abstract)

578

Rounds, F. G., 1955
P. A. Bennett, and G. J. Nebel.
SOME EFFECTS OF ENGINE-FUEL VARIABLES ON EXHAUST-GAS HYDROCARBON CONTENT. S. A. E. Trans., v. 63, 1955: 591-601. (Paper presented at the S. A. E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955) DBS

The results of mass spectrometer and Orsat analyses for hydrocarbon content of exhaust gases from 163 passenger cars and 8 public-transit buses, operated at idle, part throttle, and simulated deceleration, are presented; some practical methods of reducing hydrocarbon losses from motor vehicles are suggested. The hydrocarbon content varies appreciably with driving condition, being greatest during simulated deceleration. A substantial reduction in hydrocarbon content could be obtained by adjustment of the idle mixture ratio to the range resulting in best idle operation. Tables and graphs show the effects of fuel type, air/fuel ratio, engine type, engine speed, compression ratio, intake manifold vacuum, and transmission type on hydrocarbon content, and compare the analyses with results of other investigators.

579

Ruchhoft, C. C. 1954
F. M. Middleton, H. Braus, and A. A. Rosen.
TASTE- AND ODOR-PRODUCING COMPONENTS IN REFINERY GRAVITY OIL SEPARATOR EFFLUENTS. Indus. and Eng. Chem., v. 46, Feb. 1954: 284-289. DLC (TP1.I6, v. 46)

Gravity-oil-separator effluents from 5 refineries were studied to determine the types and quantities of materials present that contribute to taste and odor when discharged into surface drinking-water sources. The organic materials in the effluents were concentrated by adsorption on active carbon and by liquid-liquid extraction. The apparatus is pictured, and the systems diagrammed. Examination by spectrophotometry and chromatography of the recovered extracts indicated the neutral materials, largely aliphatic and aromatic hydrocarbons and cyclic sulfur compounds, to be the principal source of odorous components in these wastes. Threshold odor tests were employed to estimate the magnitude of the odor contribution from such wastes. Data from these tests and examinations are tabulated and graphed. (Quoted in part)

580

Rudolf, H. T. 1955
DESIGN AGAINST ATMOSPHERIC CORROSION. Corrosion, v. 11, Aug. 1955: 347t-350t.
DLC (TA462.C65, v. 11)

An increase in temperature or relative humidity, combined with the presence of atmospheric pollutants, accelerates corrosive action on metal surfaces. Total exposed areas may be reduced by adopting the proper shapes of structural members, and by enclosing with planar plates structures including angles and braces. Since structures exposed to the atmosphere ultimately require surface preparation, plane surfaces should be provided. Specific design recommendations are made to minimize corrosion damage.

581

Ruppert, R. W. 1955
NOMOGRAPH SIMPLIFIES DUCT DESIGN. Heating, Piping, and Air Conditioning, v. 27, July 1955: 127-128. DLC (TP7201.H45, v. 27)

This nomograph provides a solution to 3 equations used in airflow determinations. These determinations are applicable to the design of exhaust, ventilating, and dust collecting systems. An example of the use of the nomograph is cited.

582

Russell, A. A. W. 1954
AN ABSORBER FOR MISTS AND GASES IN AIR. Analyst, v. 79, Aug. 1954: 524-525.
DLC (QD71.A45, v. 79)

The absorber consists of a cylindrical glass vessel with a sintered glass plate at both ends. The absorbent is layered about 1 in. thick on the lower plate, and the sample is drawn in from the bottom through the plate, at rates up to 5 l/min. The upper plate serves as an impinger, and collects any spray formed.

583

Sagalyn, R. C., 1955
and G. Faucher.
INVESTIGATION OF CHARGED NUCLEI IN THE FREE ATMOSPHERE. Geofis. pura e appl., v. 31, May-Aug. 1955: 182. (Summary). (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955)
DGS

The results are given of an investigation of time variations in the vertical distribution of charged nuclei in the atmosphere as they were measured and recorded by instruments installed in a B17 aircraft. Recordings were made of the concentration of nuclei, mobility, electrical conductivity, temperature, pressure, humidity, and airspeed. In each series of tests, all flights were carried out over a fixed flight path with measurements made at altitudes between 700 and 15,000 ft. In all flights occurring shortly after sunrise to early afternoon, a systematic increase with time was shown in the charged-nuclei concentration up to the level at which turbulent and convective mixing extended. The findings on the flights of late afternoon and night were separated into 2 main groups corresponding to periods of low and high wind velocity. During periods of low advection, a systematic decrease with time was observed in concentrations from midafternoon to sunrise, probably because of nuclei coagulation and subsidence in the atmosphere. During periods of intense advection, nonsystematic changes with time occurred which were found to be the result of continued instability in the lowest layers of the atmosphere and to inhomogeneities in the air mass. Above the exchange layer, the changes in concentration with time at a given level were found to be nonsystematic. Time variations in electrical conductivity were summarized and shown to be primarily the result of changes in the nuclei concentration; support for this interpretation is given by the nature of the changes with time in the horizontal variations of charged nuclei, electrical conductivity, and humidity.

584

1955
ST. LOUIS PARK CREATES A PATTERN FOR INCINERATORS. Amer. City, v. 70, Oct. 1955: 110-112. DLC (HT101.A5, v. 70)

St. Louis Park, Minn. is the first suburban community to build its own incinerator. The plant has a capacity for 150 tons of refuse/24 hr, but at present receives only 35 tons/8-hr operating day. Some features of the plant are: furnaces with fans for forced-draft ventilation at 7,000 cu ft of air/min; a solid bridge wall in the expansion chamber to collect fly ash; and water-quenched ash hoppers in the incinerator. The smoke density of gases discharged from the 116-ft stack never exceeds the No. 1 Ringelmann color.

585

Sallee, E. D., 1956
and R. H. Miller.
PROBLEMS IN THE CALIBRATION OF INDUSTRIAL HYGIENE INSTRUMENTS. Amer. Indus. Hyg. Assoc. Quart., v. 17, June 1956: 193-196, illus. DLC

A technique of obtaining known vapor concentrations for use in calibrating methods and apparatus for evaluation of solvent vapors is discussed. In this technique, the solvent is contained in a glass ampoule which is crushed within a 500-l tank fitted with an air mixing fan, a device for crushing the ampoule, a heating element to volatilize solvents of low vapor pressure, a thermometer and various openings for sampling, removing, and replacing the vapor-laden air. The concentration is reduced stepwise by withdrawing measured increments of the air-vapor mixture, then replacing with fresh air. The instrument readings are then plotted against the known concentrations sampled, and a calibration curve is drawn. Instruments are checked prior to each major field trip; in the field, an assurance of proper operation can be obtained by checking the instrument against a known concentration of styrene. The same tank is also employed for checking the airflow rate of electrostatic precipitators.

586

Sarjant, R. J. 1955
SMOKE ABATEMENT IN BRITAIN. Nature, v. 176, Nov. 5, 1955: 863-864.
DLC (Q1.N2, v. 176)

A summary is given of various aspects of the problem of smoke abatement in Britain as they were discussed at the annual conference of the National Smoke Abatement Society, held in Bournemouth, Sept. 28-30, 1955. Smokeless combustion practices received special attention, and the value of domestic heating by centralized methods was emphasized. Various examples of the successful application of central heating, as means of reducing atmospheric pollution, are mentioned.

587

Schalla, R. L. 1953
and G. E. McDonald.
VARIATION IN SMOKING TENDENCY. Indus. and Eng. Chem., v. 45, July 1953: 1497-1500.
DLC (TP1.I6, v. 45)

A study of the smoking tendency of low molecular weight hydrocarbons is presented. The smoke-free burning rates for gaseous hydrocarbons were determined by passing the gases through a flowmeter calibrated for individual gases, and then visually observing the smoke emitted from a burner tube. Liquid hydrocarbons were determined by placing them in a wick lamp to be weighed before and after burning. Data relative to the hydrocarbons used in the study are tabulated, and the apparatus is diagrammed. Graphs are given for the smoke-free fuel flow plotted against the number of carbon atoms, and also against the carbon-ash bond strength. A theory is proposed that the increased bond strength and skeletal stability correspond to increased smoking tendencies.

588

Scheel, L. D., 1954
B. Smith, J. Van Riper, and E. Fleisher.
TOXICITY OF SILICA. II. CHARACTERISTICS OF PROTEIN FILMS ADSORBED BY QUARTZ. Arch. Indus. Hyg. and Occupat. Med., v. 9, Jan. 1954: 29-36. DLC (RC963.A14, v. 9)

In attempting to study the physiological mechanism for the toxicity of silica, it was decided to pursue further an earlier finding (Scheel, L. D., and others. Toxicity of Silica: I. Silica Solution. Arch. Indus. Hyg. and Occupat. Med., v. 8, 1953: 564-573) that quartz particles 1 to 3 microns in diameter adsorb protein from solution. Using quartz crystals from the batch prepared for use in the earlier study, and protein solutions of crystalline egg albumin, bovine albumin, and fibrinogen, it was found that the amount of protein adsorbed by the crystals was a function of the pH, and of the concentration of the protein solution. The alteration of protein in the adsorbed film was clearly shown, and it is entirely possible that the toxicity of the quartz crystal following inhalation is caused by a foreign protein reaction of the body tissues.

589

Schmidt, A. C., 1955
and L. L. Wiltshire.
A CONSTANT FLOW SUCTION UNIT FOR AEROSOL SAMPLING WORK. Amer. Indus. Hyg. Assoc. Quart., v. 16, June 1955: 134-140, illus. DLC

A suction unit has been developed and tested which will automatically draw air into filter samplers at a preset constant rate in spite of wide variations in the resistance of the collecting media. Two models are described, one having a fixed flow rate of 10 cu ft/min and the other being adjustable between 1 and 15 cu ft/min. Components were selected to make them portable, and to enable them to operate under adverse field conditions. Flow control is achieved by using a vacuum-operated valve ahead of the pump to compensate for upstream pressure variations and maintain constant pumping conditions. In performance tests, the units kept the flow constant within 5% while the pressure drop at the intake was increased from 0 to nearly 8 in. of Hg. (Authors' abstract)

590

Schrenk, H. H. 1954
INDUSTRIAL HYGIENE: SULFUR DIOXIDE. Indus. and Eng. Chem., v. 46, Feb. 1954: 103A. DLC (TP1.I6, v. 46)

A group of humans was exposed to sulfur dioxide concentrations from 1 to 8 ppm through face masks. On the average, they noticed dryness in the throat and upper respiratory tract at about 5 ppm, but as the exposure continued they became accustomed to it. In some, the pulse and respiratory rates increased.

591

Schrenk, H. H. 1954
INDUSTRIAL HYGIENE: TOXICITY OF OZONE AND OXIDES OF NITROGEN. Indus. and Eng. Chem., v. 46, Oct. 1954: 111A-114A. DLC (TP1.I6, v. 46)

Guinea pigs which were exposed to 0.2 ppm of ozone continuously died after 7 or 8 months, while exposure to 20 ppm of ozone caused death after only a few hr. Ozone causes irritation of the mucous membranes and the lungs, although 3/4 of it is decomposed in the upper respiratory tract before reaching the lungs. Rats, mice, rabbits, and dogs, in that order, are susceptible to pulmonary edema and hemorrhage after 4-hr exposure to 4 ppm of ozone. Rats exposed to nitrogen pentoxide in concentrations from 1 to 4 ppm showed symptoms from salivation to dyspnea, and in some cases death. Nitrogen dioxide was not as toxic and irritating as nitrogen pentoxide.

592

Schweitzer, P. H. 1956
A NEW CONCEPT OF DIESEL COMBUSTION. Automotive Indus., v. 114, June 15, 1956: 66-67, 132-133, 136, 140. DLC (TL1.A6, v. 114)

In the combustion process, oxidation as well as pyrolysis takes place. Smoke increases as the carbon-hydrogen ratio and the carbon bond strength increase, and as the volatility decreases. Thus the choice of fuel, in addition to an efficient engine design, is important. A diesel engine was designed in which the fuel was vaporized inside the cylinder, and ignited by a spray of liquid fuel. The fuel is sprayed against a cool combustion wall, a rapid hot-air swirl is created over the vaporizing fuel layer, and another fine spray of fuel is ignited in the hot air, which in turn ignites the vaporized fuel. This method provides combustion without smoke, and with a minimum amount of carbon particles.

593

1953
SCIENTISTS DECLARE WAR ON AIR POLLUTION. Sci. News Letter, v. 64, Aug. 8, 1953: 85. DCU

A report by the American Society of Mechanical

Engineers indicated that 37 American and Canadian research institutions are investigating air-pollution problems. The report lists the institutions engaged in the study, and the aspects of the work conducted by them.

594

Scott, J. A. 1953
FOG AND DEATHS IN LONDON, DECEMBER 1952. Publ. Health Rep., v. 68, May 1953: 474-479, illus. DLC (RA11.B17, v. 68)

Comparison of the mean daily temperatures recorded at Kew Observatory for the same period and with records for the past 80 yr, shows that the period of the London fog, Dec. 5-8, 1952, was also one of very low temperatures. Analysis of the deaths registered weekly from Nov. 16 through Dec. 27, 1952, indicates that the number of deaths registered for the week ending Dec. 13, increased markedly to a figure far above the normal winter maximum, remaining high for several weeks. The increase in mortality, more pronounced in infants and the elderly, was not confined to persons of any particular age. Deaths were often connected with difficulty in breathing. The rise in death rate was similar to that following a comparable fog in 1873, but was much greater, being similar in number to that of the worst week of the last cholera epidemic in 1866.

595

1956
SCRUBBER CLEANS EXHAUST GASES. Air Conditioning, Heating, and Ventilating, v. 53, Jan. 1956: 106. DLC (TH7201.H4, v. 53)

A dust control unit, known as the Type A Hydroprecipitator scrubber, that removes microscopic solids, fumes, and odors from exhausts, collects dust by hydrocompressing exhaust gases through a system of multiple tubes into a water chamber. The water agitation set up causes secondary pressure turbulence and additional scrubbing action in the tube chamber. The scrubber comes in 15 sizes for capacities ranging between 500 cu ft/min and 40,000 cu ft/min. (Quoted in part)

596

Seely, B. K. 1955
DETECTION OF CERTAIN IONS IN 10^{-10}- TO 10^{-15}-GRAM PARTICLES. Analyt. Chem., v. 27, Jan. 1955: 93-95. DLC (TP1.I615, v. 27)

The modified spot-test methods described are extensions of a technique previously described for the identification of micron and submicron chloride particles. The technique depended upon microscopic observation of chemical reactions in the surface of a gelatine medium sensitized with a mercurous salt. This paper discusses in detail similar procedures for the identification of copper, cobalt, nickel, ferrous and ferric ions, sodium, and potassium, as well as iodides and carbonates in particulate matter. The sensitivity of the method permits the identification of masses 4-6 orders smaller than is possible by conventional spot-test procedures. The methods have been used primarily for the study of atmospheric particles, but they may be applied to other fields of study. (Author's abstract)

597

Seifert, H. E., 1955
and J. H. Fanney, Jr.
A UNIQUE WET COLLECTOR FOR LIGHT-WEIGHT AGGREGATE DUSTS. Amer. Indus. Hyg. Assoc. Quart., v. 16, Dec. 1955: 301-306, illus. DLC

The amount of effluent from the kilns of a lightweight aggregate industry plant was 50,000 cu ft/min. Several commercial dust collectors failed after a few weeks operation because of the abrasive action of the dust, and the high sulfur content and 500°F temperature of the effluent. As a result, a satisfactory dust collector (over 90% efficient) was designed of specially treated wood for resistance to heat and acid, with a series of baffles and nozzles being installed to increase the collection efficiency.

598

Sensenbaugh, J. D., 1954
and W. C. L. Hemeon.
A LOW-COST SAMPLER FOR MEASUREMENT OF LOW CONCENTRATION OF HYDROGEN SULFIDE. Air Repair, v. 4, May 1954: 5-7, 25. (Paper presented at the 47th Annual Meeting of the Air Pollut. Control Assoc., Chattanooga, Tennessee. May 3-6, 1954) DLC

The A.I.S.I. Automatic Smoke Sampler was modified to obtain a continuous record of hydrogen sulfide concentrations, below the limit of odor perception (0.1 ppm). Air from which black solids have been filtered, is drawn through a Whatman no. 4 filter paper tape impregnated with a solution containing 5% lead acetate and 5% glycerine. The paper blackens when about 0.0005 cc of hydrogen sulfide passes through it, and the tape may be shifted to a new position after any desired time interval. Results of 8 months operation of the sampler are summarized, and a calibration curve for estimation of quantity of hydrogen sulfide from the intensity of the stain is given. This instrument was developed for investigations in which the concentrations of hydrogen sulfide present are apparently below the odor threshold.

599

Setterlind, A. N. 1953
PREPARATION OF KNOWN CONCENTRATIONS OF GASES AND VAPORS IN AIR. Amer. Indus. Hyg. Assoc. Quart., v. 14, June 1953: 113-120, illus. DLC

Some of the difficulties encountered in preparing known concentrations of gases and vapors in air, especially concentrations below 10 ppm, are discussed. Such mixtures are needed in the calibration of instruments, and inthe testing of various methods and techniques. In the "dynamic" method, which is useful in large scale experiments involving exposure chambers for toxicological studies, the dilution is achieved by feeding the gas or vapor, as well as the air, at controlled rates into a gas mixing chamber. In the "static" method a known quantity of gas or vapor is introduced into a vessel of known volume and, after thorough mixing, a portion of the mixture is withdrawn. To eliminate the errors due to dilution when the incoming air replaces the amount withdrawn,it is suggested that several bottles (usually 5) of large size (13 gal) be connected in series by tubing, etc. A method of introducing the solvent into the vessel using a glass ampoule, which is crushed within the vessel, is described.

600

Sherlock, R. H., 1955
and E. J. Lesher.
DESIGN OF CHIMNEYS TO CONTROL DOWNWASH OF GASES. Trans. Amer. Soc. Mech. Engineers, v. 77, Jan. 1955: 1-9.
DLC (TJ1.A7, v. 77)

Diagrams are given showing the flow of gases from chimneys under different atmospheric conditions, changes in the gas velocities, and variations in the terrain. The dimensions of a model of a hypothetical plant and chimney are given, and the results of wind-tunnel tests are plotted for reference in the design of other structures and chimneys. A data sheet summarizes the relationships which exist between wind and gas velocity, height of the stack and the building, and the height of the gas plume from the chimney.

601

Sherwin, K. A. 1955
EFFLUENTS FROM THE MANUFACTURE OF SUPERPHOSPHATE AND COMPOUND FERTILIZERS. Chem. and Indus., no. 41, Oct. 8, 1955: 1274-1281. DLC (TP1.S6332, no. 41)

Methods for controlling emissions from plants producing sulfuric acid, superphosphate, and granular fertilizers are presented. In compliance with regulations limiting the acidity of effluents to 4 grains of sulfur trioxide/cu ft of gas, one sulfuric acid plant has relied on a water scrubber to reduce the sulfur trioxide content of exhaust gases to about 0.7 - 0.8 grains/cu ft. In superphosphate production, typical exit gases amount to 6000 cu ft/min, and contain various particles which flock together to deposit on the surfaces of the system. Methods have been investigated to scrub the exit gases and prevent the formation of these deposits. Packed scrubbers are useful if the gas concentrations are not too high; a den scrubbing system is feasible if the exit gases contain no more than the equivalent of 0.143 grains of fluorine/cu ft; and if the removal efficiency is less than 99%, jet condensers are satisfactory because of their low overall cost and compactness. The effluent gases after the production of granular fertilizers amount to 15,000 cu ft/min. Most of the dust can be removed by high-duty cyclones, which separate out dust particle sizes from 40 to 400 microns, leaving particles with a mean size of about 10 microns. This separation is followed by wet scrubbing which reduces the acidity to about 0.005 - 0.025 grains of sulfur trioxide/cu ft.

602

Shore, V. C. 1954
and M. Katz.
AEROSOL CONTAMINANTS. MEASUREMENT AND IDENTIFICATION BY MICROSCOPIC AND X-RAY DIFFRACTION TECHNIQUES. Amer. Indus. Hyg. Assoc. Quart., v. 15, Dec. 1954: 297-303, illus. (Presented as DRCL rep. no. 154 at the 15th Annual Meeting of the American Industrial Hygiene Association, Chicago, Apr. 28, 1954) DLC

Methods and techniques employed, and the results obtained, are discussed in relation to an international project to determine the chemical constitution and physical characteristics of crystalline, inorganic aerosol contaminants; some size and shape properties of other suspended impurities, in the Greater Windsor-Detroit area are also considered. Constituents of the air which have been identified by x-ray diffraction are calcium carbonate, silica, aluminum metal particles, gypsum, ammonium chloride, magnetite, hematite, nickel fluoride, graphite, carbon, brass, solder, and cadmium carbonate. By use of the electron microscope, some of the minute particles which have been identified by their characteristic appearance are: carbon particles, some metallic oxides, and bacteria.

603

1952
SHOULD APARTMENT-HOUSE INCINERATORS BE PERMITTED? Amer. City, v. 67, Apr. 1952: 15. DLC (HT101.A5, v. 67)

Los Angeles attributes part of its smog problem to small domestic incinerators, while New York City attributes 30% of its air pollution to apartment-house incinerators. According to a legal proposal which has been presented to the New York City Council, the following incinerator design features are suggested: (a) chambers for complete combustion; (b) auxiliary heat to dry refuse, maintain ignition temperatures, and create air movement; (c) secondary combustion chambers in which gas velocity is decreased to settle fly ash; and (d) screens to catch fly ash.

604

Silverman, L. 1954
SAMPLING INSTRUMENTS FOR AIR POLLUTION SURVEYS. Publ. Health Rep., v. 69, Oct. 1954: 914-924, illus. DLC (RA11.B17, v. 69)

The selection and use of suitable sampling instruments for appraising atmospheric contamination in industrial areas are discussed in detail. A tabulation entitled "Comparison of Various Devices Commonly Used for Stack, Effluent, and Aerosol Sampling", classifies the instruments according to their method of operation. The information is presented under the headings: type of contaminant; application; sample volume; sampling rate; particle-size range; and limits or efficiency of operation.

605

Silverman, L. 1955
TECHNICAL ASPECTS OF HIGH TEMPERATURE GAS CLEANING FOR STEEL MAKING PROCESSES. Air Repair, v. 4, Feb. 1955: 189-196, 231. (Paper presented at the East Central Section Meeting of the Air Pollution Control Association at Youngstown, Ohio, Sept. 23, 1954) DLC

High-temperature gas cleaning is difficult because it is usually associated with extremely fine particles dispersed in gases at temperatures of 500° to 1500°F. Customary procedures, including centrifugal collectors, wet collectors, and filtration units are generally not applicable without auxiliary equipment. Electrostatic precipitators will not perform above 500°F. without some treatment of the gas stream. Fundamental studies on methods of controlling and removing effluents from open-hearth steel manufacturing operations are being carried out by the Subcommittee on Air Pollution Control of the American Iron and Steel Institute. These studies are in 2 phases, agglomeration devices and filtration media. The use of rock wool as a filtering agent appears promising. (Public Health Eng. Abstracts, v. 35, June 1955: 1)

606

Silverman, L. 1955
SAMPLING AND ANALYZING AIR FOR CONTAMINANTS. Air Conditioning, Heating, and Ventilating, v. 52, Aug. 1955: 88-100.
DLC (TH7201.H4, v. 52)

Methods for sampling and analyzing air contaminants are tabulated as follow: (1) principal collection methods for air contaminants; (2) direct chemical reaction devices for gases or vapors using impregnated granules or gels; (3) direct chemical reaction devices for gases or vapors using test papers; (4) chemical reaction devices for gases or vapors using direct indicating liquids; (5) physical methods employed in air analysis; and (6) direct chemical reaction devices for particulates. Illustrations of various types of samplers and absorbers for gases and vapors, and collecting devices for particulate matter are presented and described.

607

Silverman, L., 1956
and C. E. Billings.
METHODS OF GENERATING SOLID AEROSOLS. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 76-83. DLC

Data for the materials and equipment used in the production of solid aerosols are tabulated. Samples of static dust concentrations are used for tests in sampling, calibrations, and physiological studies; samples of dynamic dust concentrations are used to test collecting devices, to study aerosol behavior, and for research on larger particles. Various methods for generating solid aerosols from dry powders, as well as from liquid suspensions, are discussed, and some of the equipment is illustrated. Aerosols may be formed by using one of the following primary methods: (1) crushing or grinding particles; (2) combustion of organic or inorganic substances; (3) condensation of the vapors of materials that have been volatilized; and (4) evaporation of a volatile liquid solution containing the aerosol.

608

Simonson, W. H. 1955
SECOND REPORT OF SPECIAL TASK COMMITTEE ON ROADSIDE DESIGN TO REDUCE TRAFFIC NOISE, DUST, AND FUMES. PART 2. PRELIMINARY REPORT ON REDUCTION OF FUMES WITH SPECIAL REFERENCE TO ROADSIDE DESIGN. In Abatement of Highway Noise and Fumes. Highway Research Board Bulletin 110. National Academy of Science - National Research Council Publication 363, Washington, D. C., 1955, p. 42-46, illus. (Paper presented at the 34th Annual Meeting, of the [Highway Research Board], Jan. 11-14, 1955) TID

This is a short discussion of some of the harmful or toxic substances in traffic fumes, e.g., carbon monoxide, acrylic aldehydes, benzol, and lead; how they affect the individual; conditions under which traffic fumes may enter motor vehicles; their effect in causing traffic accidents; and some suggestions for reducing danger from such fumes. The results of an earlier (1938) survey of 1,000 vehicles, after 5 min operation on an open highway, showed that 2% of the vehicles contained dangerously high concentrations of carbon monoxide sufficient to affect seriously driver behavior. Contrary to the general belief, the concentrations were generally higher in vehicles with 1 or more open windows. The conversion of the refrigerant Freon, (used in automobile air-conditioning systems) by accidental exposure to flame, to the extremely poisonous gas phosgene is also mentioned. Two methods of roadside design are suggested as aids in decreasing the danger from traffic fumes: (1) keep dense plantings well back from the travelled highway to allow diffusion of exhaust fumes, and (2) provide more parking turnouts and rest areas on heavily travelled roads to provide relaxation and fresh air for motorists, and a chance for them to ventilate their cars.

609

Singer, I. A., 1955
and M. E. Smith.
SAMPLING PERIODS IN AIR POLLUTION EVALUATIONS. (Abstract). Analyt. Chem., v. 27, June 1955: 1034. (Paper presented at 3d National

Air Pollution Symposium, Pasadena, Apr. 18-20, 1955) DLC (TP1.I615, v. 27)

Much attention has been devoted to instrumentation and techniques for air-pollution sampling, but the problems involved in proper field applications have been largely neglected. Recent investigations of time and space variations of test pollutant concentrations from an elevated source at Brookhaven National Laboratory were described. They reveal that sampling periods are as important as techniques in air-pollution evaluations. Examples were selected from actual field data to show that very different answers to the same problem may be obtained by various combinations of equipment and sampling times. (Authors' abstract)

610

Sloan, R., 1955
J. H. Shaw, and D. Williams.
INFRARED EMISSION SPECTRUM OF THE ATMOSPHERE. Jour. Opt. Soc. Amer., v. 45, June 1955: 455-460. DLC (QC350.06, v. 45)

The emission spectrum of the earth's atmosphere as observed at ground level is compared automatically with a spectrum approximating that of a blackbody at the boiling point of liquid nitrogen at atmospheric pressure. The most prominent features of the atmospheric spectrum between 4 microns and 15.5 microns, observed during daylight and darkness when the sky is clear, are due to emission by carbon dioxide, ozone, and water vapor; the intensity of the water vapor emission shows pronounced variations with atmospheric temperature and humidity. The spectrum of an overcast sky resembles that of a blackbody. By comparing the recorder traces of the atmospheric spectra with similar traces obtained with a blackbody source, it is possible to estimate the effective radiation temperature of various portions of the sky for various atmospheric conditions. (Authors' abstract in part)

611

1955
SMALL DUST-COLLECTING CYCLONE. Engineers' Digest, v. 16, May 1955: 212.
DLC (TA1.E7149, v. 16)

By drawing a known amount of the flue gases through this [dust-collecting] cyclone, at an approximate rate of 20 cu ft/min, it is possible to extract 95% of all solid matter down to a particle size of about 2 microns. This flue gas can be drawn through by means of a small blower or steam extractor, and the flow can be measured by means of a single orifice plate and inclined pressure gauge.

612

Smalley, G. E., 1955
and J. W. Klohr.
RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL. Chapter 17. In Problems and Control of Air Pollution. New York, Reinhold, 1955, p. 191-201.
DLC (TD883.I5, 1955)

Elementary sulfur is recovered in liquid form from the H_2S gas resulting from catalytic refining processes by controlled combustion with air:

$$2H_2S + 3O_2 \rightarrow 2SO_2 + 2H_2O$$

$$2H_2S + SO_2 \rightarrow aS_2 + bS_6 + cS_8 + 2H_2O.$$

The H_2S formerly was burned to SO_2 in flare stacks or boilers. Maximum recovery of sulfur and minimum losses of H_2S and SO_2 occurred with initial H_2S:SO_2 ratios of 2:1. The residual H_2S is burned in a gas-fired incinerator. The emission from this incinerator contains more SO_2 than permitted by the Apr. 1949, revision of the "Rules and Regulations" [of Los Angeles County], i.e., 0.2% by volume from any single source (Rule 53(a)). On Nov. 16, 1954, a new rule (Rule 53.1. Scavenger Plants) was added which permits the Air Pollution Control officer to issue permits to operate "where the total emission of pollutants is substantially less with the plant in operation than when closed, even though the concentration exceeds that permitted by Rule 53(a)."

613

Smith, I. J. 1955
THE REMOVAL OF AEROSOLS. PART I. Indus. Chemist, v. 31, Dec. 1955: 602-606.
DLC (TP1.I62, v. 31)

The removal of aerosols by cyclone separators or electrostatic precipitators is surveyed. In the former, the gas flows tangentially at a high speed into a cylinder, and then follows a spiral path. The controlling feature of its design is the pressure drop, usually dependent on the limitation of the inlet velocity. The theoretical dependence of efficiency on the diameter of the cyclone is altered by the irregularities in the gas flow, although observations indicate about 80% removal of particles 5-10 microns in size. The performance data for single and multiple units are tabulated. In electrostatic precipitation, the gas flows through 2 kinds of high-voltage electrodes: (1) the discharge electrode which emits the charge to the particles, and (2) the collecting electrode which collects the charged particles. Except for 2-stage precitators, the general equation for the efficiency of collection is: $\eta = 1 - e^{\gamma}$. Observations have indicated that the efficiency is 90% or more, depending on the unit. The performance data for several type of precipitators are tabulated.

614

Smith, J. H., 1955
and G. L. Rounds.
AIR CONTROL AND RESEARCH PROGRAM OF THE KAISER STEEL CORPORATION. Air Repair, v. 4, Feb. 1955: 185-187, 209. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

Air pollution control is a subject of intensive study at the Kaiser Steel Corp. Damage to vegetation is studied as a basis for determining the effects of mill effluents. Dustfall is measured, and the presence of various gases and metallic dusts determined. New methods of measuring particle size and improved materials to serve as economic adsorption media for objectionable gases discharged by the plant are being investigated. Efforts are being made to establish good public relations with surrounding communities so that all citizens can be made aware of the problems of air pollution. (Public Health Eng. Abstracts, v. 35, May 1955: 1)

615

Smith, M. E. 1956
ATMOSPHERIC DIFFUSION FORMULAE AND PRACTICAL POLLUTION PROBLEMS. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 11-13, 49. DLC

A general summary of air-pollution information is given reviewing the practical application of atmospheric diffusion formulas in terms of typical industrial-plant problems. A specification of the problems is given, e.g., source parameters and pollutant effects; effluent rise and local aerodynamics; and meteorological dispersion (fundamental dispersion patterns, terrain features, time factors, space factors, multiple sources, and particulate effluents); the conclusions drawn are discussed.

616

Smith, M. E. 1956
THE VARIATION OF EFFLUENT CONCENTRATIONS FROM AN ELEVATED POINT SOURCE. Arch. Indus. Health, v. 14, July 1956: 56-68, illus. DLC (RC963.A14, v. 14)

Statistical and other data are given concerning the dispersion of an oil-fog test effluent from a 355-ft source in the test stack of the 420-ft tower at the Brookhaven National Laboratory. The oil-fog was produced by condensation rather than combustion, the resulting aerosol consisting of droplets ranging from 0.05 micron to 3.0 microns with a mean radius of 0.3 micron. The oil-fog was measured by 2 different techniques: (1) photometric densitometer, operating on the basis of the 90° scattering of visible light, were used for continuous measurements at ground level; and (2) the fog was collected on molecular filters, then measured by a fluorometric device. The quantitative data, though incomplete, indicated that an orderly gradation of dispersion conditions exists, and that a generally acceptable prediction of the ground-level concentrations can be achieved during lapse conditions. The quantitative measurements made under inversions indicate that concentrations can be predicted in these cases also. The classification of gustiness of wind velocity is thought to separate correctly the major types of dispersion, but considerable refinement is needed. The tests show that the most suitable type of field sampling includes a large number of accurate devices operated simultaneously. It is apparent from the wide variations observed that the results of any field experiments will be a function of time, at least up to periods of 1 hr. (Author's abstract in part)

617

Smith, R. G., 1952
and P. Diamond.
THE MICRODETERMINATION OF OZONE. PRELIMINARY STUDIES. Amer. Indus. Hyg. Assoc. Quart., v. 13, Dec. 1952: 235-238. DLC

Micro amounts of ozone may be determined by using alkaline potassium iodide as the absorbing solution. Iodine released after acidification is determined precisely and rapidly by a spectrophotometric technique wherein the absorption of the triiodide ion at 352 millimicrons is measured. Oxygen does not appreciably oxidize the reagent, and the effect of other oxidants is discussed. (Authors' abstract in part)

618

1954
SMOG DEATHS PARTLY DUE TO TWO CHEMICALS. Sci. News Letter, v. 65, Jan. 9, 1954: 24. DCU

Dr. M. O. Amdur of Harvard University reported that sulfur dioxide and sulfuric acid mist, in combination, caused guinea pigs to breathe with great trouble. This combination also impaired growth and damaged lungs. Neither chemical when used separately for 8 hr had a noticeable effect on the animals. An analogy is made to the situation that resulted in the loss of life in London, and Donora, Pa.

619

1954
SMOG FINGERPRINTED. Indus. and Eng. Chem., v. 46, Nov. 1954: 13A. DLC (TP1.I6, v. 46)

The pattern of injury to vegetation caused by smog is different from that caused by individual gases or particles known to be present in smog. The oldest and youngest leaves are least sensitive to smog injury, and those sensitive to smog are injured from the tip to the base of the leaf as the leaf grows older. On long-leafed plants, bands of injury are formed with consecutive exposure to smog.

620

1955
SMOG: TOUGHEST AIR POLLUTION PROBLEM YET TACKLED. Eng. News-Rec., v. 155, Oct. 20, 1955: 33-35. DLC (TA1.E6, v. 155)

Los Angeles County, Calif. has set up a system of alerts for specified levels of pollution: (1) the first alert, called when carbon monoxide, nitrogen oxides, sulfur oxides, and ozone reach the levels of 100, 3, 3, and 0.5 ppm, respectively, calls for a voluntary curtailment of the use of vehicles and incineration; (2) when the levels reach 200, 5, 5, and 1.0 ppm respectively, it is mandatory that traffic and industrial operations be limited; and (3) the governor declares martial law to halt operations in the county, when the concentrations of the pollutants reach 300, 10, 10, and 1.5 ppm, respectively. Although the population, the number of vehicles, and industrial operations in the area have increased, moderate to heavy smog is prevalent only about 1/10 of the year. The smog in the county is formed mainly by photochemical reactions in the air. Research is needed to determine the substances contributing to the problem, and where they originate.

621

1955

SMOG-CAUSED DEATHS. Sci. News Letter, v. 68, Sept. 24, 1955: 207. DBS

"The opinion of informed scientists in Washington" is that the "mathematical probability" of a major catastrophe from smog-poisoning in Los Angeles will steadily increase as long as no positive action is taken to eliminate smog-forming sources. The daily smog pattern for the city, whenever temperature-inversion conditions persist, is outlined. Temperature inversions occur about two-thirds of the year, the worst season being in Sept. and Oct. Fumes from oil refineries and other industries, smoke and particles from backyard incinerators, and exhaust gases from automobiles are the most serious smog sources.

622

1955

SMOG-FIGHTING METHODS. Sci. News Letter, v. 67, Jan. 22, 1955: 54. DBS

At a symposium on air pollution at a meeting of the American Association for the Advancement of Science in Berkeley, W. L. Faith reported that carbon monoxide from auto fumes can be removed by use of nonleaded gas and a catalytic converter. Hydrocarbons can be reduced by afterburners, catalytic converters, improvement in carburetion, and better fuels; nitrogen oxides may be deactivated by the addition of iron oxide. G. P. Larson proposed to combat industry-caused smog by: (1) zoning factories to prevent harmful concentrations from occurring at a single source; (2) reducing vapors at the source by use of centrifugal collectors, electrical precipitators, cloth filters, wet collectors, etc; and (3) diluting the discharge at the source through such means as tall stacks.

623

1956

SMOKE ALARMS AND RECORDS. Amer. City, v. 71, Apr. 1956: 201. DLC (HT101.A6, v. 71)

In January 1956, New York City's Department of Air Pollution and Control was given the power to install smoke alarms and recorders on stationary fuel-burning equipment of offending violators of certain air-pollution regulations. The alarm is usually set to be actuated if smoke exceeds a no. 2 Ringelmann in density.

624

1956

SMOKE CONTROL. Chem. Week, v. 78, Apr. 14, 1956: 100. DLC (TP1.C37, v. 78)

"Whether you monitor smoke to measure air pollution or combustion efficiency, you will be able to do it more accurately, says Mine Safety Appliance Co. (Pittsburgh, Pa.), with a Smokescope. The new instrument, developed by MSA, permits the observer to view smoke through apertures that reduce background distractions, and provide direct comparison of smoke density with reference film discs. Accuracy of the Smokescope is said to compare favorably with standard Ringelmann Chart measurements under any condition of smoke density, light, and background." (Quoted in full)

625

1955

SMOKE CONTROL IN A MEDIUM-SIZED BOILER. Engineering, v. 180, Aug. 12, 1955: 222. DLC (TA1.E55, v. 180)

A light-ray projector and photoelectric receiver are mounted on opposite sides of a stack to monitor the flue gases before they are discharged to the atmosphere. A warning bell is sounded if the smoke density exceeds the limit, and a secondary air-flap opens to provide more air for combustion of the volatile materials.

626

1956

SMOKE DENSITY RECORDER. Instrument Rev. v. 3, June 1956: 197. DLC

"A smoke density recorder, designed to record density of smoke in terms of optical density.../unit length,...[is described]. Light which passes through the smoke is absorbed by a narrow portion of an annular optical wedge which moves in front of a barrier layer photocell. As the smoke density increases the total optical density is adjusted to a constant value by rotating the optical wedge until the light which falls onto this cell is equal to that which passes through a sealed reference column on to another cell. The degree of rotation of the optical wedge at the point of balance indicates smoke density...." (Quoted in part)

627

1956

SMOKE METER AND ALARM. Instrument Rev., v. 3, Nov. 1956: 434. DLC

"This equipment has been designed to meet the needs of the smaller factory (requiring only an alarm to sound when the smoke density exceeds Ringelmann 2), and also the largest power house where the actual smoke density must be indicated and recorded continuously. A beam of light from the light source is projected across the flue onto a photocell in the light receiver unit. The intensity of light reaching the photocell depends upon the density of smoke passing through the beam; the electrical output from the photocell depends upon the intensity of the light reaching it; hence, it varies with the density of smoke passing up the stack. The electrical output from the photocell passes to the electronic control unit which is mounted in any convenient place in the boiler room. This unit amplifies the signal from the photocell, operates a large scale meter so as to indicate continuously the density of smoke passing up the flue, and also automatically sounds the alarm when the smoke density exceeds Ringelmann 2." (Quoted in full)

628

1954

SMOKE REDUCTION WITH OVER-FIRE AIR. Utilization, v. 8, May 1954: 36, illus.
DLC (TP315.U85, v. 8)

Unburned carbon particles give smoke its color, and the presence of an excess of smoke means both pollution of the atmosphere and an uneconomical use of fuel. An over-fire jet system, employing a turbo-blower electronically controlled, is described which offers a practical and economical solution to fuel waste and excessive smoke. The over-fire air supply is controlled automatically by electronic or photoelectric smoke-detecting equipment and by a time relay for establishing a time-on period with each start. The device activates the turbo-blower before smoke reaches violation density.

629

1954

SPECIAL STUDY OF SULPHUR REMOVAL AND RECOVERY FROM FUELS. SUMMARY OF PROCEEDINGS OF THE LONDON CONFERENCE. Jour. Inst. Fuel, v. 27, Nov. 1954: 530-533.
DLC (TP315.I6, v.27)

The special study was conducted as a conference in London on the 6th and 7th of Oct. 1954, at the Institution of Mechanical Engineers, where 13 original papers were discussed at the 4 sessions. The industries represented at the conference comprized coal, gas, electricity and oil, chemical engineering, and iron and steel. A summary of the main conclusions is given under the following headings: deleterious effects of sulfur; sulfur elimination from fuels (coal and fuel oils); and hydrogen sulfide removal from fuel gases. The main source of indigenous sulfur in Great Britain is said to be anhydrite and gypsum, but the coal which is burned annually contains over 3 million tons of sulfur of which only 5 or 6% is recovered. Petroleum refined in Great Britain has now reached 25 million tons/yr. It contains 2.3% sulfur or a further 0.6 million tons of which about 5 or 6% is recovered. Recovery of a higher proportion from both coal and oil is essential for reasons of national economy since 75% of the sulfur required is imported. Action is made more pressing, however, by the deleterious effect of sulfur in industrial processes, particularly metallurgy and glass, and by injury to buildings, plants, and human health by the oxides of sulfur emitted to the atmosphere. (Quoted in part)

630

1955

SPECTROGRAPHIC MONITOR. Chem. Age, v. 72, Jan. 1, 1955: 30, 32, illus.
DLC (TP1.C33, v. 72)

The basic design for a continuous spectrographic sampler is described and illustrated. The air to be sampled is drawn between 2 copper electrodes, between which a spark passes. The emissions from the spark are directed to a monochromator, behind which is a photomultiplier operating a chart recorder on which the response from the system is indicated semi-quantitatively.

631

1956

SPECTROGRAPHING SMOG. Indus. and Eng. Chem., v. 48, Feb. 1956: 14A-15A.
DLC (TP1.I6, v. 48)

The Franklin Institute in Philadelphia, Pa. has made studies of artificial air pollutants in concentrations of 1-40 ppm using infrared spectroscopy with the path length to the spectrograph varying from 12 to 500 m. Efforts were made to identify the formation of ozone, considered to be the oxidizing agent in smog. The reaction of nitrogen dioxide and a representative organic compound produced ozone and an unidentified characteristic spectrum.

632

Spendlove, J. C. 1957

PRODUCTION OF BACTERIAL AEROSOLS IN A RENDERING PLANT PROCESS. Publ. Health Rep., v. 72, Feb. 1957: 176-180.
DLC (RA11.B17, v. 72)

During the 10-week period that the carcasses of several 100 ornithosis-infected turkeys were being processed by an animal-rendering plant on the outskirts of Portland, Ore., 24 of 32 employees showed symptoms of ornithosis. To test the hypothesis that the method of processing the carcasses was creating contaminated aerosols, 2 chromogenic bacterial cultures were painted on the animal carcasses and sprinkled on other materials before processing began. Serratia marcescens is a vegetative form showing little resistance to heat and drying, while Bacillus globigii is a spore-forming organism more resistant to heat and drying. It was found that the rendering process did create an aerosol, with the heaviest concentration occurring near the grinder and gut hasher; the vegetative organisms persisted in these machines following their initial inoculation; both organisms survived the processing, were released to the outside atmosphere, and could be recovered 100 ft downwind from the exhaust stack. In order to control the contamination, it was recommended that all animal material other than hides be heated prior to processing, and that the plant machinery be redesigned to minimize the production of aerosols.

633

Spiegel, C. J., 1953
and others.
SMALL CHAMBER FOR STUDYING TEST ATMOSPHERES. Arch. Ind. Hyg. and Occupat. Med., v. 8, Sept. 1953: 286-288, illus.
DLC (RC963, A14, v. 8)

A small chamber for testing atmospheric conditions has been designed which combines both versatility in use and simplicity of construction. Details of the construction of the device, together with some of its uses, are given.

634

1954
SPINACH TO DETECT AIR POLLUTION. Amer. City, v. 69, Nov. 1954: 172.
DLC (HT101. A5, v. 69)

Laboratory and field studies were made to determine the causes, occurrence, and intensity of smog, which causes $480,000 damage annually to vegetation in Los Angeles County, Calif. Endive growth, when exposed to smog, was stunted to about half its normal size. The pattern of smog damage is distinctive, and can be distinguished from damage by insects and frost.

635

1955
SPRAY STRAINER STOPS POLLUTANTS. Chem. Week, v. 76, Feb. 26, 1955: 44, illus.
DLC (TP1. C37, v. 76)

"This [illustrated] oversize wire-mesh pad could be one of the answers to the long quest for inexpensive pollution controllers. Already used with success in entrainment separation, the units are now testing their worth (about $345 each) in containing toxic dispersions such as finely divided caustic spray and wettable parathion dust. The Yorkmesh Demister, made from knitted stainless steel wire and measuring 4 ft across and 6 in. deep, is being used in a tower scrubber where caustic is employed by a big chemical firm to scrub organic material from steam. The pad, claims manufacturer Otto H. York Co., Inc. (W. Orange, N. J.), eliminates all earlier evidence of escaping caustic at tower lop even at full sparge." (Quoted in full)

636

1956
SPRAY SYSTEM SUPPRESSES INCINERATOR ODORS. Amer. City, v. 71, Jan. 1956: 13.
DLC (HT101. A5, v. 71)

A 1:100 gal mixture of Sanifil, a chemical liquid concentrate, and water is sprayed automatically into the refuse storage pit through 8 nozzles along a 50-ft manifold. This is designed to eliminate incinerator odors from the Brookline [Mass] incinerator, and to settle dust from refuse being dumped into the storage pit.

637

1956
SPURS POLLUTION CONTROL. Chem. Week, v. 78, Feb. 4, 1956: 22, 24. DLC (TP1. C37, v. 78)

Along the Houston Ship Canal, 54 industrial plants which contribute to the smog conditions have been brought to court in the fight against air pollution. Since 1952, data have been kept on the exact quantities of hydrogen sulfide, chlorine, and other pollutants in the air. So far, 20 companies have given notice that they are proceeding with pollution abatement projects. At Phillips Chemical, cyclone precipitators are used to remove dust in the ammonium sulfate unit; scrubbing and cooling apparatus have been installed in the methylvinylpyridine unit; 2 sets of scrubbers in the ammonia unit; and a complicated scrubbing system, several cyclone precipitators, and a bag filter in the triple superphosphate unit. Nyotex Chemical Co. is using 2 water scrubbers in its hydrogen fluoride unit to remove tail gases, and plans to install a purification system that will increase product yield as well as decrease the load on the scrubbers. Champion Paper & Fibre Co. has on order a chemical-recovery furnace, an electrostatic precipitator, a blowdown condenser, and an additional lime stack scrubber.

638

Stair, R., 1955
and D. M. Gates.
SPECTRAL RADIANT ENERGY FROM THE SUN THROUGH VARYING DEGREES OF SMOG AT LOS ANGELES. (Abstract). Analyt. Chem., v. 27, June 1955: 1034. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955)
DLC (TP1. I615, v. 27)

Measurements of the radiant energy from the sun, in the spectral region of 3000 to 150,000 Å, through the Los Angeles smog, during Oct. and Nov. 1954, furnish information on the spectral absorption (also scattering) characteristics of the smog particles. These observations are compared with similar recordings made in Denver, Colo., with those made from the summit of Mt. Evans, Colo. (elevation 14,250 ft), and with those obtained in Los Angeles on smog-free days. Absorption bands of the following molecules occurring in the normal atmosphere could be readily identified: H_2O, CO_2, O_2, O_3, CO, HDO, N_2O, and CH_4. The ratios of these to the amounts contained in the smog-free atmosphere were obtained, and characteristics of the spectrum associated only with the smog were treated. A discussion was given of the development of equipment for this type of work, with a description of the double quartz spectroradiometer and the adaption of the Perkin-Elmer Model 12C infrared spectrometer to solar-energy measurements. (Authors' abstract)

639

Stairmand, C. J. 1952
DESIGN AND PERFORMANCE OF CYCLONE SEPARATORS. Internat. Chem. Eng. and Process Indus., v. 33, Feb. 1952: 89-91.
DLC (TP1.C355, v. 33)

The essential features of a cyclone dust collector include a tangential inlet for contaminated air, an axial outlet for cleaned air, and a conical base in which the dust is collected and discharged. The gas in the system moves centripetally. To achieve the highest efficiency special cyclones are suggested under various conditions: (1) two large cyclones in series are used to collect fine particles; (2) a shutter-type collector involving a change in the direction of the flow of gases deposits coarse dusts; (3) cyclones using gas velocities above 50 ft/sec prevent clogging of the ducts by sticky dusts; (4) small nested cyclones are effective in confined spaces; and (5) inclined cyclones, rather than horizontal ones, are favored for limited heights.

640

Stairmand, C. J. 1956
THE DESIGN AND PERFORMANCE OF MODERN GAS-CLEANING EQUIPMENT. Jour. Inst. Fuel, v. 29, Feb. 1956: 58-76, illus.
DLC (TP315.I6, v. 29)

The main methods of large-scale dust collection are reviewed, namely, cyclones, electrostatic precipitators, fiber and fabric filters, and wet washers, including impingement scrubbers, disintegrators, spray towers, and venturi scrubbers. In each case, a brief discussion of the probable mechanism of operation is given with a practical "grade-efficiency" curve, obtained from accurate tests on installed equipment. Finally, a method of economic assessment is described, showing how the collectors can be compared in terms of total operating costs, related to their collection efficiencies on a standard test dust. Two appendixes are included. The first gives an example showing the method of predicting the performance of a cyclone-electrostatic precipitator dedusting installation from the appropriate grade-efficiency curves, and the second describes the I.C.I. standard apparatus and method for measuring the performance of a gas-cleaning plant. (Author's abstract)

641

Standiewicz, E. J. 1955
THE DESIGN AND COMPARATIVE COSTS FOR HIGH STACKS. Combustion, v. 26, Feb. 1955: 51-56.
DLC (TJ1.C8, v. 26)

An analysis of the relation of wind forces to the structural problems in the design of plant stacks is presented. Graphical charts summarize the economic factors involved in selecting a particular stack. Steel stacks are designed for a static wind loading in lb/sq ft of projected area, with a diameter at any one section not less than 1/11 of the remaining stack height, and with a brick or lumnite-silica sand gunite lining. Average brick stacks are built for a wind load of 25 lb/sq ft of projected area, and have brick linings with a 2 in. air space between the column and the lining. Concrete stacks are lined with brick and fiberglas insulation.

642

Stebbins, F. H. 1956
WET-TYPE DUST COLLECTORS; GOOD AND BAD DESIGN. Heating and Air Conditioning Contractor, v. 47, July 1956: 44-47, illus.
DLC (TS200.S5, v. 47)

Wet-type dust collectors are particularly useful when large concentrations of lightweight dust are to be eliminated. The use of cyclones with relatively light particles is often impractical because of the large dimensions necessary to disentrain the dust. Electrostatic precipitators can often be used with such dust, but these units are restricted by their inability to handle heavy concentrations. The water pressure drop through wet-type dust collectors varies greatly, from as little as 0.5 in. of water to as much as 20 in. In general, the more efficient generators have the highest resistance and therefore create the highest pressure drops, but careful attention to design and use of material can change this greatly. Several design principles which enable a dust-laden airstream to be scrubbed thoroughly by water are discussed. The design of a newer venetian-blind type collector, and an older, inefficient type of wet-dust collector are shown and discussed.

643

Steiner, K. 1955
BURNING HEAVY FUELS. Heating, Piping, and Air Conditioning, v. 27, Aug. 1955: 100-103.
DLC (TP7201.H45, v. 27)

Smokeless, efficient burning of heavy fuel oil depends on knowledge of several things: (1) the oil viscosities and the necessary preheat temperatures involved; (2) factors determining firebox design, such as proportion of black surface to refractory surface, rate of heat release, and draft conditions: (3) the several methods of rating boilers; and (4) the latest revision of smoke control ordinances. (Author's abstract)

644

Stephens, E. R., 1956
and others.
RECENT DEVELOPMENTS IN THE STUDY OF THE ORGANIC CHEMISTRY OF THE ATMOSPHERE. Jour. Air Pollut. Control Assoc., v. 6, Nov. 1956: 159-165, illus. (Paper presented at a session on Smoke and Fumes, at the 21st Midyear Meeting, the American Petroleum Institute's Division of Refining, Montreal, Quebec, May 16, 1956)
DLC

These experiments show that ozone detected during a Los Angeles, Calif. smog attack can be accounted for by photochemical reaction of nitrogen dioxide with organic compounds. It has been suggested that the situation might be alleviated by reducing the amount of nitrogen oxides released into the atmosphere. It would be of interest to know whether ozone is produced directly from the nitrogen dioxide by the oxygen-atom mechanism outlined or whether it is a byproduct of oxidation reactions such as the diacetyl-photolysis experiment described. The sum of evidence appears to favor the former mechanism. The amount of diacetyl necessary to produce a significant ozone concentration is considerably greater than the concentration of atmospheric contaminants. Furthermore, diacetyl is apparently in a class by itself in regard to ozone formation through photolysis if systems containing combined nitrogen are excluded. Even on the basis of the mechanism involving the formation and photolysis of compound X, it would be hasty to conclude reduction in the amount of nitrogen oxides emitted into the atmosphere would proportionately reduce either the ozone concentration or smog severity (these 2 quantities are not necessarily directly proportional). The combined nitrogen may pass through this cycle many times, and may produce an ozone concentration not directly proportional to the initial nitrogen-dioxide concentration. The experiments with the 2 types of gasoline illustrate this point. (Authors' abstract)

645

Stern, A. C. 1955
TAILORING THE AIR-POLLUTION ORDINANCE TO COMMUNITY NEEDS. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 151-152, 181-182. (Paper presented at the Dust and Fume Product Group Session, Foundry Equipment Manufacturers Association, Washington, D. C., Apr. 15, 1955)

Zoning ordinances have not proved to be by themselves sufficient legislation for air pollution control. They are ineffective against residential, mobile, and portable sources. If a community must choose between the 2 forms of ordinance, an air pollution control ordinance alone is preferable to a zoning ordinance; however, the small community gets the best legislative package by adopting both an air pollution control ordinance, and a zoning ordinance, each of which is tailored to supplement and complement the other. (Author's abstract)

646

Stock, A. J. 1954
COAL SEGREGATION AS A CAUSE OF SMOKE AND ITS CORRECTION. Air Repair, v. 4, May 1954: 14-19, 45. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954)
DLC

The conditions under which coal will segregate according to size as it is fed from chutes of various designs to a stoker hopper are illustrated. Diagrams and photographs also show the contrasts between: (1) the uniform fire with a minumum of smoke produced with nonsegregated coal, and (2) the uneven fire and smoke produced with segregated coal feed. Remedies for the segregation are suggested.

647

Stocks, P.,
and J. M. Campbell. 1955
LUNG CANCER DEATH RATES AMONG NONSMOKERS AND PIPE AND CIGARETTE SMOKERS: AN EVALUATION IN RELATION TO AIR POLLUTION BY BENZ[O]PYRENE AND OTHER SUBSTANCES. Brit. Med. Jour., no. 4945, Oct. 15, 1955: 923-929, illus.
DNLM

The results are evaluated of a mid-1952 to mid-1954 study of the effects of tobacco smoking and air pollution by benzopyrene acting together upon the male population of the North Wales and Liverpool Hospital region (England). Sulfur dioxide, smoke, and 3-4 benzopyrene in the air were recorded simultaneously. Death rates in rural areas increased proportionately to the number of cigarettes smoked/week, and pipe smokers as a group ranked with cigarette smokers of about 25 a week. The rates for Liverpool exceeded the rural rates in every smoking category, but the urban/rural ratio fell progressively from about 9 to 1 among nonsmokers to a small value approaching 1 among heavy cigarette smokers. It is estimated that about 1/2 the Liverpool deaths of men from lung cancer arise from cigarette smoking, and about 3/4 of the remaining 1/2 are due to a factor which is only slightly present in rural areas. Concentration of air pollutants recorded in Liverpool is 8 to 11 times as great as in the rural localities examined, a ratio corresponding to the estimated mortality ratio among nonsmokers of the area. When death rates are compared with calculated total intake, by different categories of smokers in the areas, of benzopyrene derived from air according to certain assumptions, plus that derived from the number of cigarettes smoked, the degree of correspondence is such as to suggest that benzopyrene might be the one agent involved. (Quoted in part)

648

Stokinger, H. E. 1954
OZONE TOXICITY; A REVIEW OF THE LITERATURE THROUGH 1953. Arch. Indus. Hyg. and Occupat. Med., v. 9, May 1954: 366-383.
DLC (RC963. A14, v. 9)

This review of the literature on toxicity of ozone deals also with its chemical properties, occurrence, preparation, and uses. Ozone prepared by different methods has varying types and amounts of impurities. Prepared, with precautions to minimize impurities, ozone is both acutely and chronically toxic. The chief injurious effect of ozone inhalation is on the lungs, producing pulmonary edema and hemorrhage. Secondary effects consist of irritation of the mucous membranes, headache, and drowsiness.

649

Stokinger, H. E., 1956
W. D. Wagner, and P. G. Wright.
STUDIES OF OZONE TOXICITY. I. POTENTIATING EFFECTS OF EXERCISE AND TOLERANCE DEVELOPMENT. Arch. Indus. Health, v. 14, Aug. 1956: 158-162.
DLC (RC963.A14, v. 14)

A striking enhancement of the toxicity of ozone has been demonstrated in rats and mice when they are exercised intermittently during exposure. Ozone concentrations of 1 ppm are fatal in 6 hr in these species when accompanied by exercise for 15 min each hr during exposure. A marked tolerance to ozone has also been developed in these species. The tolerance is rapidly developed (within 24 hr) and persists for 4 to 6 weeks, as shown by survival from challenging exposures of lethal magnitude or upon reexposure to multilethal doses of ozone, and by the absence of characteristic pulmonary edema and hemorrhage that regularly follow such exposures. (Authors' abstract)

650

Stratmann, H. 1954
[A MICROANALYTICAL METHOD FOR THE DETERMINATION OF SULFUR DIOXIDE IN THE ATMOSPHERE] Eine mikroanalytische Methode zur Bestimmung von Schwefeldioxyd in der Atmosphäre. Mikrochim. Acta, no. 6, 1954: 668-678.
WU

The sulfur dioxide in the atmosphere is determined by absorbing this gas on silica gel. It is then reduced to hydrogen sulfide using a platinum catalyst at 700° - 900°C, and the product, along with any excess hydrogen, is passed into a solution of ammonium molybdate (2%) in 0.4 N sulfuric acid. The blue-violet molybdenum complex which results is analyzed colorimetrically (S57 filter, Zeiss-Opton), sulfur dioxide in amounts ranging from 1 - 200 micrograms being determined quantitatively. Gas velocities up to 300 l/hr can be handled, and quantitative determinations of 0.01 microgram of sulfur dioxide/l of air can be made easily using this method.

651

Stratmann, H. 1956
[MICROANALYTICAL DETERMINATION OF VARIOUS SULFUR COMPOUNDS IN GASES AND IN SOLID MATERIALS] Mikroanalytische Bestimmung verschiedener Schwefelverbindungen in Gasen und in festen Stoffen. Mikrochim. Acta, no. 1/6, 1956: 1031-1037.
WU

Sulfur compounds in gases, liquids, and solids are determined using a molybdenum blue reaction by reduction with hydrogen to hydrogen sulfide in the presence of platinum. Sulfur in the amount of 0.1-microgram quantities can be determined quantitatively. In certain cases, hydrogen sulfide, sulfur dioxide and trioxide, sulfide-, sulfite-, and sulfate-compounds, and organo-sulfur compounds can be determined selectively by employing various chemical reducing methods.

652

Straub, R. A. 1955
POTENTIAL DANGERS FROM EXPOSURE TO DIESEL LOCOMOTIVE EXHAUST. Indus. Med. and Surg., v. 24, Aug. 1955: 353-358.
DLC (RC963.A37, v. 24)

The more important contaminants in the exhaust fumes from diesel locomotives which might constitute a threat to human health are: carbon monoxide, oxides of nitrogen, oxides of sulfur, aldehydes and similar chemicals, allergens, and carcinogens. Carbon monoxide and methane are potentially dangerous only because they displace oxygen below physiologic requirements. Medical consequences of exposure to these substances, as well as some of the legal aspects, are discussed. Diesel engines are said to be infinitely less dangerous to operate than gasoline-powered engines. Normally the carbon monoxide output at operation levels higher than idling is lower than 100 ppm, whereas some gasoline engines normally produce carbon monoxide at a rate of about 15%. The aldehydes, which cause irritation of the nasal and bronchial passages, increase as the carbon monoxide content rises, and act as a warning mechanism of impure air. Tests conducted in various railroad tunnels, roundhouses, and repair shops for diesel locomotives, indicate that routine exposures to polluted atmospheres are extremely low, and are practically nonexistant in the cab of a diesel locomotive.

653

Street, J. C., 1955
and A. Thomas.
CARBON FORMATION IN PREMIXED FLAMES. Fuel, v. 34, Jan. 1955: 4-36, illus.
DLC (TP315.F7, v. 34)

The critical concentration of air required to suppress carbon formation in the flames of a number of fuels has been investigated, and the data tabulated. A general diagram of the apparatus used in the investigations, as well as the auxiliary apparatus for introducing additives are illustrated. Illustrations of typical flames are explained. The effect of temperature, the oxygen concentration, and the fuel additives are plotted against the critical fuel ratio for carbon formation for a number of fuels. As shown graphically, the mean critical concentration generally increases with an increase in the molecular weight of the fuel.

654

Strom, G. H. 1952
WIND-TUNNEL TECHNIQUES USED TO STUDY INFLUENCE OF BUILDING CONFIGURATION ON

STACK GAS DISPERSAL. Amer. Indus. Hyg. Assoc. Quart., v. 13, June 1952: 76-80, illus.
DLC

The use of wind-tunnel techniques in the study of air-pollution problems associated with stack gas emission and building configuration is discussed. These techniques are said to offer relatively inexpensive means for studying such problems.

655

Strom, G. H., 1955
and J. Halitsky.
IMPORTANT CONSIDERATIONS IN THE USE OF WIND TUNNEL FOR POLLUTION STUDIES OF POWER PLANTS. Trans. Amer. Soc. Mech. Engineers, v. 77, Aug. 1955: 789-795. (Paper no. 54-SA-41 presented at the Semiannual Meeting of the American Society of Mechanical Engineers, Pittsburgh, Pa., June 20-24, 1954) DA

Theoretical bases for wind-tunnel experiments on stack-gas pollution by power plants are examined, and important variables and scale factors are presented. Test results are given to show some effects of these variables. The test procedure now in use at the New York University 3.5- by 7-ft wind tunnel is described. Correlation with limited field data is presented with a discussion on accuracy of wind-tunnel experiments. (Authors' abstract)

656

Strom, G. H. 1956
WIND-TUNNEL SCALE MODEL STUDIES OF AIR POLLUTION FROM INDUSTRIAL PLANTS. Indus. Wastes, v. 1, Jan-Feb. 1956: 104-109.
DLC

Wind-tunnel scale-model techniques, and equipment for the study of air pollution problems are described. The data needed for a scale model investigation, the planning of a test program, the conducting of tests, and some experimental results of a hypothetical case are discussed. The effect of wind direction and of stack variables, in relation to air pollution, are considered; however, the effect of other buildings or topographical features are not taken into account, nor are the variables introduced by thermally induced atmospheric turbulence. Such wind-tunnel scale model studies have been effective in investigating atmospheric dispersal characteristics of gaseous wastes discharged from stacks; thus, modifications of plant design or operating methods can be tested for their effect in eliminating air pollution. It is pointed out that the problem of thermally induced atmospheric turbulence should be carefully considered in future studies.

657

Stroud, E. G., 1952
and W. H. J. Vernon.
THE PREVENTION OF CORROSION IN PACKAGING. III. VAPOR-PHASE INHIBITIONS. Jour. Appl. Chem., v. 2, Apr. 1952: 178-183, illus.
DLC (TP1.S612, v. 2)

Of many compounds examined in vapor form in moisture-laden air, a number will, in varying degrees, afford protection to ferrous and some non-ferrous metals when contained in the same enclosed space. Complete inhibition of the corrosion of steel and cast iron may be effected in moist air, even when heavily contaminated with sulfur dioxide, by certain amine carbonates (e.g. cyclohexylamine carbonate). These compounds also possess the property of arresting the further corrosion of iron and steel surfaces that have already become rusted by exposure to moist polluted air. The experiments have served the double purpose of confirming the efficiency of the organic carbonate as a vapor-phase inhibitor in highly polluted atmospheres and of demonstrating the usefulness of sulfur dioxide additions for the purpose of accelerating the corrosion test. (Authors' abstract in part)

658

1955
STUDY SMOG PROBLEM USING BREATHLESS HUMANS. Sci. News Letter, v. 22, Jan. 22, 1955: 54.
DBS

A study is being conducted by J. J. Phair of the U. of Cincinnati to determine whether there is any specific association between air pollution and effects in the well-being of people most likely to be affected by air pollution. It is reported that patients who are short of breath because of chronic heart or lung trouble are particularly susceptible to air pollution.

659

1954
SULFUR DIOXIDE DETECTOR. Chem. Eng., v. 61, May 1954: 280, illus. DLC (TN1.M45, v. 61)

"An accurate, easy-to-use portable instrument [illustrated] quickly determines sulfur dioxide concentrations from 0 to 50 ppm in the atmosphere. You merely squeeze the aspirator bulb 3 times for an adequate air sample. Reagent in the tube turns from blue to white. Length of decolorization is directly proportional to the percent of sulfur dioxide in the sample." (Quoted in full)

660

1956
SULFUR DIOXIDE ISOLATION. Chem. and Eng. News, v. 34, Jan. 23, 1956: 394.
DLC (TP1.C35, v. 34)

A specific method, developed at Louisiana State U. (G. C. Gaeke), for isolating and estimating sulfur dioxide in the atmosphere is outlined. Sulfur dioxide reacts with a solution of sodium tetrachloromercurate (II) to form disulfitomercurate (II) ion, which is determined photometrically from the purple color developed when pararosanile hydrochloride and formaldehyde are mixed with the scrubbing solution. Air samples collected in the field can be analyzed later with no decrease in sulfur dioxide concentration from volatilization or oxidation.

661

1953
THE SULPHUR PROBLEM. Gas World, v. 138, Oct. 3, 1953: 837-839. DLC (TP700.G2, v. 138)

More than 1,000,000 tons of sulfur are discharged from industrial chimneys each year, about 1/4 of this being recoverable. Whether this is feasible depends on the costs involved in the recovery, and the balance between the costs and the reduction in sulfur damage. A history of sulfur removal is given, and various new processes are discussed. The oil industry has introduced a method using diethanolamine to wash a hydrogen sulfide fraction which results in a solid 99.5% pure product. A vacuum carbonate process removes 80-85% hydrogen cyanide as well as hydrogen sulfide, and conserves heat by using a vacuum and interchanging heat.

662

1955
"SURPLUS" RADAR WAVES NOW USED AGAINST SMOG. Sci. News Letter, v. 67, Mar. 19, 1955: 183. DBS

At the University of California in Los Angeles the microwave absorption patterns of smog samples are being studied in the laboratory to identify the smog components. In a second phase of the study, microwaves will be beamed across the Los Angeles Basin and the resulting absorption patterns recorded.

663

Suter, H. R. 1955
RANGE OF APPLICABILITY OF CATALYTIC FUME BURNERS. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 173-175, 184, illus. DLC

Vapor-phase catalytic oxidation is relatively new in the field of air-pollution control. A discussion of the mechanisms of catalytic oxidation and some of the general principles of its applicability are presented. It is concluded that with intelligent treatment of the practical and technical factors involved, the application of catalytic combustion in the air-pollution-control field will continue to grow. (Quoted in part)

664

Swensson, A., 1956
J. Glomme, and G. Bloom.
ON THE TOXICITY OF SILICA PARTICLES. Arch. Indus. Health, v. 14, Nov. 1956: 482-486, illus. DLC (RC963.A14, v. 14)

In contrast to the findings of previous authors, study of the toxicity of silica particles of various sizes showed that with intravenous injection in the mouse the toxicity fell off with increasing size of the particle, in any case, in the range 0.01 micron to 1.0 micron. The toxicity of amorphous silica was considerably less than that of the crystalline type of the same particle size. In preliminary experiments with intratracheal and intraperitoneal injection of particle suspensions in the rat, it was found that the finest silica particles of 0.01 micron to 0.02 micron were considerably more toxic than the coarser samples. (Authors' abstract)

665

Swietlik, W. M. 1954
WATER SPRAYS GIVE MILWAUKEE A FLY-ASH FREE INCINERATOR. Amer. City, v. 69, Sept. 1954: 90-92. DLC (HT101.A5, v. 69)

In compliance with the Milwaukee County Smoke Regulation Ordinance that flue gases contain no more than 0.85 lb of dust/1000 lb of flue gas with 50% excess air, an incineration plant was built in Milwaukee designed to burn a mixture of 50% garbage and 50% combustible refuse with a 55% moisture content. The plant is equipped with refuse storage pits, charging hoppers, and furnaces having stoking arms, and dumping grates. Ashes and noncombustibles are dumped into a conical ash hopper, quenched with water, and collected in trucks. Gases from the furnace pass from a combustion chamber into a common breeching constructed to form a water pond for removal of the fly ash before the gases are expelled into a 175-ft chimney. Foul plant air is blown into the furnace, and discharged through the chimney. Dimensions and operational costs of the plant are given.

666

Tebbens, B. D., 1954
and J. D. Torrey.
PAPER CHROMATOGRAPHY FOR IDENTIFYING AIR POLLUTANTS. Science, v. 120, Oct. 22, 1954: 662-663. DCU

Air samples were analyzed for fatty acids using paper chromatography. The chromatograms obtained from air polluted by stack and auto exhaust gases contained lower fatty acids including an unidentified component.

667

Tebbens, B. D., 1956
J. F. Thomas, and M. Mukai.
HYDROCARBON SYNTHESIS IN COMBUSTION. Arch. Indus. Health, v. 13, July 1956: 567-573. DLC (RC963.A14, v. 13)

This literature review deals with the presence of polyaromatic compounds, such as benzopyrene, in smoke-contaminated air, and also with the production of such compounds following combustion of gaseous fuels. Earlier evidence indicated their presence on incomplete combustion of solid or liquid fuels. Current studies demonstrate their formation following combustion of hydrocarbon gases. A mechanism is suggested for the formation of these polyaromatic compounds from aliphatic compounds of much lower molecular weight. Many of the compounds have been identified tentatively in the current studies, using chromatography and ultraviolet spectrophotometry. (Authors' abstract in part)

668

Tebbens, B. D. 1956
FLOW CALIBRATION OF HIGH-VOLUME SAMPLERS. Amer. Indus. Hyg. Assoc. Quart., v. 17, Sept. 1956: 327-329, illus. DLC

The gauge incorporated into the commercial high-volume samplers studied was found to be capable of measuring flow rates within 10% of the actual rate over a range from about 25 to 70 cu ft/min. Various changes in the equipment to increase the calibration range of this technique are discussed. The procedure described makes it possible to check quickly the flow calibration.

669

Tebbens, B. D., 1956
J. F. Thomas, and M. Mukai.
AROMATIC HYDROCARBON PRODUCTION RELATED TO INCOMPLETE COMBUSTION. Arch. Indus. Health, v. 14, Nov. 1956: 413-425, illus. (Paper presented at the Air Pollution and Engineering Sections, American Industrial Hygiene Association, Philadelphia, Pa., Apr. 26, 1954)
DLC (RC963.A14, v. 14)

Incomplete combustion of any carbonaceous material results in the formation of condensed multinuclear aromatic hydrocarbons. This has been positively verified in the laboratory for gaseous fuels, and tentatively verified for solid and liquid fuels. There are a minimum of 16 compounds falling in this class of hydrocarbons whose presence can be detected by the chromatographic techniques discussed. Eight of these compounds have been identified tentatively, of which 2 have known carcinogenic activity. Atmospheric samples taken on "smoggy" days also contain the same hydrocarbons. In contrast, complete combustion of gaseous fuels does not result in the significant production of any of their hydrocarbons, nor can their presence be detected in significant quantities in atmospheric samples taken on "nonsmoggy," sunshiny days. The extent to which arenes contribute to the total pollutional load has yet to be defined. Since incomplete fuel combustion is a typical phenomenon in many human activities, including home and industry heat and power sources, transportation, refuse incineration, etc., the disposal of polynuclear hydrocarbons to the atmosphere is very widespread. It will be abated only when some other criteria than convenience and economy are used in regulating smoke pollution sources. (Authors' abstract)

670

ter Linder, A. J. 1953
CYCLONE DUST COLLECTORS FOR BOILERS. Trans. Amer. Soc. Mech. Engineers, v. 75, Apr. 1953: 433-440. DLC (TJ1.A7, v. 75)

Some of the factors affecting air pollution near a boiler plant are: (1) the quantity of gas and dust leaving the stacks; (2) the size of dust particles; (3) the stack height; and (4) the surroundings. For the greatest efficiency, the stack should be about 2 or 3 times the height of the highest building in the area. Different cyclone dust collectors operating on centrifugal force are diagrammed, and the diagrams explained. For good efficiency, the collectors should be constructed with a reduced danger zone, that is, the zone immediately beneath the exhaust opening, and a gradual gas entry. The danger zone can be reduced by "increasing the tangential velocity, and by decreasing the exhaust diameter and the radial velocity of the gases." Diagrams are given to explain the gas flow within the cyclone, and graphs show the dependence of efficiency on various aspects of cyclone construction and operation. Consideration is given to the relationship which exists between the size of the dust particles, and the size of the cyclone dust collector.

671

1955
TEST CASE ON INDUSTRY CLAIMS. Chem. Week, v. 77, Dec. 3, 1955: 34, 36.
DLC (TP1.C37, v. 77)

Reynolds Metals Co. is soon to appeal a $36,293 judgement to a rancher over alleged injury from industrial air pollution. Paul Martin, whose ranch is situated about 1 mile east of Reynolds' plant near Troutdale, Ore., claimed injury to himself, his wife and daughter, and his livestock from Reynolds' aluminum reduction plant. Two doctors testified that the Martins had suffered fluoride poisoning; 4 doctors testified that they could find no evidence of fluorosis. In 1946 when Reynolds acquired the plant, it had open pots and hoods over the furnaces, and all fumes were emitted into the atmosphere untreated. Since then, at a cost of $2.5 million, equipment (ventilators, centrifuge units, scrubbers) has been installed that handles waste gases at the rate of 2.25 million cu ft/min. In view of the air-pollution controls installed and the conflicting medical testimony, Reynolds may win the appeal; 18 other claims for a total of $875,000 for damages to dairy cattle and pasture land against Reynolds 2 smelters in the Pacific Northwest were thrown out of court when Reynolds' pollution controls were found to be "fully effective".

672

1955
THAT DARKNESS AT NOON. Smokeless Air, v. 25, Spring 1955: 138. DLC (TD884.S855, v. 25)

An enormous smoke cloud, estimated to be at least 20 miles in width and some 2 miles deep, passed over London and moved to the south coast on Sunday, Jan. 16, 1955. The cloud resulted from an accumulation of smoke over northern London in cold air underlying a warmer cloud layer. It proceeded toward a cold front, reversing its direction on contact. The situation was dramatic because of the great density and speed of the cloud, and the almost night-time blackness which resulted. It was concluded that practically all of the smoke must have been of domestic origin. No mention is made of any physical injury.

673

Thomas, C. D., 1955
M. K. Gainer, and T. W. Ball.
RELATION OF RADON TO NONACTIVE AIR CONTAMINATION. Nature, v. 175, Apr. 23, 1955: 732-733. DLC (Q1.N2, v. 175)

The atmospheric content of radon during the 4 months, Nov. through Feb. 1953-1954, was studied following daily samplings of air drawn through filter paper. Although variations in radon over this period were considerably less than instances quoted by W. Anderson, W. V. Mayneord, and R. C. Turner (Nature, v. 174, Sept. 4, 1954: 424-426), the correlation with dust present was strikingly evident. No attempt was made to identify the type of dust collected, but it was noted that the observations were made in Morgantown, W. Va., where coal is a common domestic and commercial fuel.

674

Thomas, F. A., Jr., 1954
and others.
FOG TYPE SCRUBBERS. Amer. Indus. Hyg. Assoc. Quart., v. 15, Dec. 1954: 283-289, illus. DNLM

The effectiveness of fog type scrubbers is a function of the finely atomized scrubbing medium. These scrubbers may be conveniently classed according to the method of generation of the fog. A rapid method of evaluation of dust samples is explained in conjunction with performance tests of a fog scrubber. Air induced by the fog is evaluated and an expression of the following form obtained: $Q=f(n^{0.39}e^{P/549})$, where Q = flow in cu ft/min, n = no. of nozzle banks, P = pressure. Entrainment of scrubbing medium in the discharge air stream is examined and the following conclusion drawn: (1) entrainment decreases with increasing pressures and airflow rates for moderate and high fog pressures; (2) entrainment increases to a maximum, and then decreases with increasing airflow rates for low and marginal fog pressures; (3) entrainment from fog type scrubbers can be reduced or eliminated by using a high pressure scrubbing section prior to discharge of the air. (Authors' abstract in part)

675

Thomas, F. S. 1956
ATMOSPHERE ANALYZER FOR ATOMIC-POWERED SUBMARINES. Research Reviews (Office of Naval Research, Washington), Nov. 1956: 13-15, illus. DLC (Q180. U5A335, 1956)

An instrument for determining and recording the concentrations of the major components of the atmosphere has been installed in each of the 2 atomic-powered submarines, the USS Nautilus and the USS Sea Wolf. The analyzers for carbon monoxide, carbon dioxide, and hydrocarbon vapors are basically identical, nondisperse infrared spectrographs, one for each component. Each spectrograph is composed of 2 major assemblies -- the radiation unit, which is on the front of the panel, and the electronic amplifier, which is on the back. The radiation receiver for each analyzer is a pure, sealed sample of the atmosphere component whose concentration is determined in that element; thus, the receiver can respond only to those portions of the infrared spectrum corresponding to the component's molecular structure. The analyzer for oxygen makes use of the unique paramagnetic property of oxygen. Thus, a nonmagnetic test body placed in a magnetic field tends to be forced out of that field only by the oxygen in the atmosphere sample. The hydrogen concentration in the sample is determined by comparing the rate of heat transfer through the gas sample with that through a sealed dry-air reference. This method can be used because hydrogen is the only major constituent of the submarine atmosphere whose thermal conductivity is greatly different from that of air. The use of these physical methods provides highly selective, rapid, continuous analysis without the use of liquids, chemicals, or manual operation.

676

Thomas, J. W., 1956
and R. E. Yoder.
AEROSOL PENETRATION THROUGH A LEAD-SHOT COLUMN. Arch. Indus. Health, v. 13, June 1956: 550-555, illus. DLC (RC963.A14, v. 13)

Calibration curves, applicable only to spherical particles of unit density, are presented which permit the use of a lead-shot column for particle-size estimation in the radius range of 0.1 to 1.0 micron. (Authors' abstract in part)

677

Thomas, J. W., 1956
and R. E. Yoder.
AEROSOL SIZE FOR MAXIMUM PENETRATION THROUGH FIBERGLAS AND SAND FILTERS. Arch. Indus. Health, v. 13, June 1956: 545-549. DLC (RC963.A14, v. 13)

An aerosol size for maximum penetration was established experimentally using either FG-50 Fiberglas filter material or sand filters. For the Fiberglas material, it is: 0.25 micron radius for 0.94 cm/sec face velocity; 0.27 micron for 0.42 cm/sec; 0.29 micron for 0.21 cm/sec; and 0.35 micron for 0.094 cm/sec. With large particles and low velocities, the filtration efficiency for sand filters was much higher for downflow than for upflow. (Authors' abstract in part)

678

Thomas, M. D. 1956
THE INVISIBLE INJURY THEORY OF PLANT DAMAGE. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 205-208, illus. (Presented at the 48th Annual Meeting of the Air Pollution Control Association, Detroit, May 22-26, 1955) DLC

Air pollutants and their relation to "invisible injury" of vegetation (Stoklasa) are discussed. "This 'injury' is defined as interference with growth, photosynthesis, respiration, reproduction, or enzymatic function or demonstrable increase in susceptibility to disease, without attendant lesions or discolorations on the leaves, stems, or roots of the plant." Evidently little "invisible injury" is caused by sulfur dioxide. The oxidizing conditions in smog, however, seem to be more effective in causing this type of injury. There is also evidence that it may be caused by toxic fluoride ions when threshold concentrations are exceeded. Some "invisible injury" may also be brought about by coal smoke in its interference with the normal reactions in the leaf. It is also pointed out that "invisible plant injury" is reversible, that is, the plants recover when the toxic agent is removed. This is so in the case of sulfur dioxide, hydrogen fluoride, and possibly smog.

679

Thompson, D. C., 1952
R. H. Baker, and R. W. Brownlow.
OZONE RESISTANCE OF NEOPRENE VULCANIZATES. Indus. and Eng. Chem., v. 44, Apr. 1952: 850-856. DLC (TP1.I6, v. 44)

The resistance of neoprene vulcanizates to attacks by atmospheric ozone was shown by subjecting the samples to 25% strain for 8 hr at 24°C under ozone concentrations of 1-3 ppm. The preparation of samples, and the method used in the tests are discussed. Some of the compounding ingredients which provide a positive resistance to ozone are waxes, accelerators, fillers, esters and oils, and antioxidants. Various antioxidants on the samples were exposed to ozone concentrations from 1-100 ppm, but the most favorable results were obtained with antioxidants combined with waxes. Tabular data are given for the effects of various compounding ingredients on ozone resistance.

680

Thompson, R. G., 1955
T. L. Myron, and C. J. Davis.
ELECTROSTATIC PRECIPITATOR STUDIES FOR OPEN-HEARTH GAS CLEANINGS. Jour. Air Pollut. Control Assoc., v. 5, Nov. 1955: 139-141, 162, illus. (Paper presented at the 48th Annual Meeting of the Air Pollution Control Association, Detroit, Mich., May 22-26, 1955) DLC

Pilot-plant investigations, including preliminary tests with a small-scale pipe-type electrostatic precipitator and more comprehensive tests with a large dry-duct precipitator, were conducted during studies of open-hearth gas cleaning. Many of the findings emphasized the fact that the smaller the unit, the better its performance, so that it is important not to consider small-scale results as directly indicative of the performance to be expected of a large commercial installation. Although the experiments with both types of precipitators yielded a considerable amount of valuable information concerning electrostatic cleaning of open-hearth gas, especially with respect to scaling up precipitator size, they did not, as was hoped, indicate any promise of substantially reducing the required size or the cost of precipitators for a given gas-cleaning job. Accordingly, tests are now being conducted to determine the possibility of employing other types of cleaners, e.g., high-energy wet scrubber (orifice or venturi scrubber) for the cleaning of open-hearth gas. (Quoted in part)

681

Thorp, C. E. 1954
BIBLIOGRAPHY OF OZONE TECHNOLOGY. VOLUME I. ANALYTICAL PROCEDURES AND PATENT INDEX. Chicago, Armour Research Foundation, Illinois Institute of Technology, 1954, 209p. DLC (Z5524.O9T5, v. 1)

Part 1 deals with the various analytical procedures and techniques for estimating ozone, either gaseous or liquid. It contains 266 annotated references classified by the analytical method involved (chemical, optical, ultraviolet, visible, and miscellaneous); a section on rubber cracking is included. An author, and a subject index are also provided. Part 2, "Ozone Patent Bibliography," contains 980 references listed by patentee under a subject classification. A patentee index, and a patent number index by countries are included. The bibliography is said to cover most of the literature published since the work of Schoenbein (1845), who first isolated and named ozone, through 1953.

682

Thorp, C. E. 1955
BIBLIOGRAPHY OF OZONE TECHNOLOGY. VOLUME II. PHYSICAL AND PHARMACOLOGICAL PROPERTIES. Chicago, Armour Research Foundation, Illinois Institute of Technology, 1955, 160p. DLC (Z5524.O9T5, v. 2)

Part 1 considers the physical properties of ozone. At the conclusion of the textual material, a bibliography of 392 annotated references on the physical constants of ozone is presented. Part 2, "Ozone Pharmacological Properties," gives textual material on toxicity to animals, toxicity to humans, and medical and dental experimentation. Concluding this part is a bibliography on the pharmacological properties of ozone containing 185 annotated references. Both bibliographies are arranged alphabetically by author; the concluding short subject index is for the whole volume of references which range in time from the 1850's to 1955.

683

Thorp, N., 1955
R. Long, and F. H. Garner.
CARBON FORMATION IN HYDROCARBON DIFFUSION FLAMES. Fuel, v. 34, Apr. 1955: S1-S13. DLC (TP315.F7, v. 34)

A study has been made of the carbonaceous residues from diffusion flames of aromatic, naphthenic, and paraffinic fuels. Fractions have been obtained from these by solvent extraction and chromatography; their infrared and ultraviolet absorption spectra have been recorded. There are 3 interesting absorption bands at 1700, 1620, and $1570\,cm^{-1}$: (1) the first arises from the conjugation of a $C=O$ group; (2) the second is due to a $-C=C-$ stretching vibration; and (3) the third is probably the conjugation of a double bond with a ring system. (Authors' abstract in part)

684

Todd, G. W. 1955
MODIFICATION OF FERROUS THIOCYANATE COLORIMETRIC METHOD FOR DETERMINATION OF SOME ATMOSPHERIC OXIDANTS. Analyt. Chem., v. 27, Sept. 1955: 1490-1492. DLC (TP1.I615, v. 27)

Data for the ferrous thiocyanate method for the determination of peroxides, modified and used for the determination of gaseous oxidants, are presented. The reagent responds to very low concentrations of the reaction products of ozone and hexene or gasoline while being fairly insensitive to ozone alone. It is somewhat sensitive to nitrogen dioxide but not to nitrous oxide, formic acid, formaldehyde, valeric acid, or isovaleraldehyde. It appears to be useful in sampling naturally polluted atmospheres as well as atmospheres artificially polluted with various ozonated hydrocarbons. Graphical comparisons of this method, and the potassium iodine method are given. (Author's abstract in part)

685

1955
TOOLS FOR AIR CHEMISTRY. Chem. and Eng. News, v. 33, Nov. 14, 1955: 4980-4981. DLC (TP1.C35, v. 33)

New instruments developed for air-pollution research are: (1) a device to measure and record on a single graph the concentrations of 4 air pollutants (oxidant, oxidant precursor, nitrogen dioxide, and nitric oxide); (2) the ozone radiometer, a photoelectric device, which measures ozone concentration by the absorption of ultraviolet light; (3) a sensitive carbon monoxide recorder for outside use; (4) a device for automatically and continuously measuring and recording hydrocarbon concentration; (5) a "photo-electronic aerosol particle counter", which segregates atmospheric particles into 20 size groups; and (6) a 1-lb aero-meteorograph, which is to be attached to small captive balloons and used to obtain continuous readings on temperature, air pressure, and relative humidity at various levels.

686

Towler, J. H., 1954
and B. H. Holland.
ANALYSIS OF THE UNSATURATED HYDROCARBONS IN FUEL GASES BY INFRARED SPECTROSCOPY. I. ANALYSIS OF A TOWN'S GAS. Jour. Appl. Chem., v. 4, Sept. 1954: 517-524, illus. DLC (TP1.S612, v. 4)

Carbonization gases and carburetted water gas contain 2-7% unsaturated hydrocarbons which may affect the combustion of the gas. The unsaturated hydrocarbons are isolated in 2 stages: (1) removal of the condensable compounds by refrigeration, and (2) separation of the remaining hydrocarbons as bromine addition compounds. Apparatus for the isolation of the unsaturated hydrocarbons which flow at a rate of 2 cu ft/hr is illustrated. The 2 groups of compounds are isolated by fractional distillation, and analyzed by a Grubb-Parsons single-beam spectrometer.

687

1956
TOXICITY OF OZONE. Science, v. 124, Aug. 3, 1956: 213. DLC (Q1.S35, v. 124)

Biologists from the Armour Research Foundation of the Illinois Institute of Technology will attempt to study the toxicity of ozone on humans. The study will be undertaken for the US Air Force School of Aviation Medicine, Randolph Air Force Base, Tex., in the ozone chamber there; 6 investigators at the Base will be exposed to controlled concentrations of ozone. Exposure will be to 1 to 10 parts of ozone in 1 million parts of air in an 8-day series of experiments. Previous experiments on laboratory animals have shown that exposures as low as 12 parts ozone to 1 million parts of air proved fatal to some animals within 3 hr; however, the dose required to kill 50% of common laboratory animals was in the range of 20 to 35 parts of ozone to 1 million parts of air. (Quoted in part)

688

1956
TRACING ATMOSPHERIC POLLUTANTS. Science, v. 123, Mar. 1956: 451. DLC (Q1.S35, v. 123)

By using a special smoke, the paths of pollutants in the atmosphere may be traced. The tracer material, finely divided zinc-cadmium, is fed into a stack that disperses it into the air. Sample devices located downwind suck in the air bearing the tracer smoke, particles of which are identified by ultraviolet rays. By counting the number of particles collected per unit time, the concentration can be determined.

689

1955
TREATING TRADE EFFLUENTS. Chem. Age, v. 73, Oct. 29, 1955: 946. DBS

The Chloronome process, developed by the Patterson Engineering Co., uses chlorine to purify gaseous industrial effluents, and to reduce or eliminate noxious odors. The equipment and its operation are described briefly.

690

1955
A TRIO OF FUEL REPORTS: NATIONAL COAL BOARD, NATIONAL INDUSTRIAL FUEL EFFICIENCY SERVICE, AND FUEL RESEARCH BOARD. Smokeless Air, v. 26, Autumn 1955: 36-40. DLC (TD884.S855, v. 26)

The Report and Accounts of the National Coal Board (Gt. Brit.), 1954, discusses the part the Board can play in helping to implement the recommendations of the Beaver Committee. The Board's research in 1954 into ways of increasing the supply of domestic smokeless fuel culminated in the pilot plant production of 1 type of smokeless briquettes from small coal. Also an experimental plant to oxidize 1 ton of coal an hr and make it into briquettes was begun during the yr. Still in the laboratory stage is a process for making up briquettes without the necessity of a binder. The National Industrial Fuel Efficiency Service (Gt. Brit.) was incorporated on Dec. 2, 1953 as a nonprofit organization. In the annual report (1954) of the Fuel Research Board (Gt. Brit.), it is recorded that the Fuel Research Station (Gt. Brit.) was able to render service of the utmost value to the Beaver Committee on Air Pollution, but it is noted that to implement the recommendations of that committee will require a considerable extension of the work of the Station on many problems of reducing air pollution. Many of the problems of fuel economy being investigated are closely linked to the question of smoke abatement.

691

Turk, A. 1954
APPRAISAL OF ODOR PROBLEMS. Air Repair, v. 4, Aug. 1954: 3-6. (Paper presented at the 47th Annual Meeting of the Air Pollution Control Association, Chattanooga, Tennessee, May 3-6, 1954) DLC

The role of analytical methods in the appraisal of odor problems in air pollution is reviewed. Sampling by adsorption, absorption, and condensation is explained. A number of illustrative examples of analytical methods is also given. Various abatement methods commercially available are discussed. These include: counteraction; masking; adsorption; incineration; catalytic combustion; and scrubbing. (Public Health Eng. Abstracts, v. 34, Nov. 1954: 1)

692

Turk, A. 1955
ODOR CONTROL METHODS: A CRITICAL REVIEW. Indus. Med. and Surg., v. 24, Apr. 1955: 177-182, illus. DLC (RC963.A37, v. 24)

This review discusses odor-control methods, information, and equipment, under the major headings of combustion methods, adsorption methods, and vapor mixing. It stresses that there is no one universal odor-control method. Situations may be so complex technically that no commercially available equipment is economically satisfactory. Practical odor problems often require individual study, and a combination of treatments may be indicated. Whenever feasible, pilot installations should be made before large-scale applications of any control method. It is concluded that further research and development on odor-control methods are needed. (Author's abstract in part)

693

Tyler, H. W. 1956
SAFETY STRESSED IN SEATTLE'S VEHICULAR SUBWAY. Amer. City, v. 71, Aug. 1956: 108-109. DLC (HT101.A5, v. 71)

A number of small fans are used in Seattle's vehicular subway to force in fresh air at a high velocity, and to discharge contaminated air naturally through openings in the ceiling. In the detector cells, carbon monoxide is oxidized in a catalytic exothermic reaction to carbon dioxide and the thermopile produces an electromotive force in proportion to the carbon monoxide present in the air. Nine fans are started when the carbon monoxide content reaches 1.5 parts/10,000 in one section; 72 fans operate at 3 parts/10,000; and stop signs flash in the tunnel at 6 parts/10,000.

694

Uhleen, A. E. 1955
and C. T. Hayes.
AIR POLLUTION K.O.'D. Instrumentation, v. 8 (2), 1955: 21-24. DA

The effectiveness of Oxycat catalyst in removing solvent fumes in the baking ovens of the Enamelstrip Corp. in Allentown, Pa. is described. Tests showed that 99% of the air pollutants were being removed 3 yr after the original bed of catalyst units was installed. A civil court case, brought against the company, charging air pollution was settled out of court after installation of the catalyst units.

695

Uicker, G. B. 1956
SURVEY OF GAS-FIRED DOMESTIC INCINERATORS. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 199-202, 243-244. (Presented at the 48th Annual Meeting of the Air Pollution Control Association, Detroit, May 23-26, 1955) DLC

Fourteen gas-fired domestic incinerators were tested in order to determine their efficiency. The emission of odors and smoke, the agitation of test load, the condensation of greases, the hazards and time of operation, and the resultant air pollution were investigated. It was concluded that the incinerators could not be operated in an odor-free manner, and would result in a neighborhood nuisance; the smoke problem would not be alleviated to a great extent; the incinerators were a potential fire hazard; and, in general, air pollution would almost certainly result from the present type gas-fired domestic incinerator.

696

1953

ULTRAVIOLET PHOTOMETER. Mech. Eng., v. 75, May 1953: 408. DLC (TJ1.A72, v. 75)

An ultraviolet photometer capable of measuring minute concentrations of gases by recording the change in intensity of an ultraviolet beam passing through a sample of gas has been developed by the DuPont Co. It is sensitive to a decrease in light of 1 part in 10,000. A new apparatus to mix gases of known concentration has been added to check the calibration of the photometer.

697

1956

UP IN THE AIR OVER ODOR CONTROL. Chem. Week, v. 78, Jan. 28, 1956: 98, 101, illus. DLC (TP1.C37, v. 78)

A description is given of the odor-control program of Proctor & Gamble Co., which has cost more than $2.8 million in 10 yr of operation. Proctor & Gamble started by setting up its own odor standards, and pursuing a quantitative concept of odor which measures it directly, regardless of its source. Samples are taken by filling a small medical syringe with exhaust gas, and transferring a measured volume to a larger dilution syringe. The dilution syringe is then completely filled with odor-free air, and the dilute mixture is sniffed to see if the sample can be detected. The lowest ratio of injected sample volume to the total diluted volume at which the odor is detectable is taken as the concentration. The most expensive control measure is the installation of special equipment (spray condensers, packed scrubbers, enclosed vent systems, and various types of filters). Where none of the other means is satisfactory, odorous gases are sent up the stack where they are dispersed over a calculated stack-diffusion pattern. Illustrated is a high-velocity venturi which scrubs odorous dust from exhaust air.

698

1956

USES FOR GAS CHROMATOGRAPHY. Chem. and Eng. News, v. 34, Apr. 23, 1956: 1981-1982. DLC (TP1.C35, v. 34)

Vapor phase chromatography can be used to analyze mixtures of air pollutants containing 25 components. A synthetic 17-component smoke mixture can be separated into 7 primary fractions, divisible into smaller fractions for identification by mass spectrometry.

699

1954

VACUUM ASH-HANDLING SYSTEM. Utilization, v. 8, May 1954: 31, illus. DLC (TP315.U85, v. 8)

"An 8-in. full-vacuum ash-handling system, designed for a new addition to the municipal power plant at Jamestown, N. Y., eliminates manual handling of ashes and reduces maintenance and supervision to a minimum. Furnace ash, fly ash, soot and dust are conveyed through the system in a dry condition by vacuum, the material being delivered to an ash storage silo. The vacuum is created by a steam exhauster located beyond the ash receiver on top of the silo. At no time does the ash come in contact with the steam. The electrostatic precipitators, which collect the soot and dust are located on the roof of the power plant, thus necessitating operation of the dust hopper gates by remote control. This is accomplished by automatic sequential control operated from a control panel in the boiler room. Motor-driven rotary vane feeders are used to feed dust from the precipitator hoppers into the fly ash line. . . . Furnace ash and dust from the boilers are fed into the system through enclosed gates, thus eliminating dustiness in the boiler room. The ash receiver discharges the collected material into the storage silo, from which it is removed through a rotary ash unloader. The unloader proportions the flow of ash and a controlled amount of water to give the material the proper consistency for dustless removal." (Quoted in part)

700

Vandaveer, F. E. 1956

DOMESTIC GAS-FIRED INCINERATORS. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 197-198, 242, illus. (Presented at the 48th Annual Meeting of the Air Pollution Control Association, Detroit, May 23-26, 1955) DLC

An investigation of the efficiency of domestic gas-fired incinerators was made by the East Ohio Gas Co., Cleveland, Ohio. Several models were tested, and surveys made to determine the amount of smoke emitted. Reasons were given, with supporting evidence, for their acceptability to air pollution officials. A description of improved experimental models is given.

701

Vandaveer, F. E. 1956

THE DOMESTIC GAS-FIRED INCINERATOR'S ROLE IN AIR-POLLUTION CONTROL. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 90-97, illus. DLC

A smokeless, odorless, fly-ash-free domestic gas-fired incinerator is being developed by the gas industries. A test mixture for incineration consisting of 60% food refuse and 40% combustible material was burned at high temperatures in 2 stages. In the first stage, drying, ignition, and combustion took place, while in the second stage the combustion products were completely oxidized. Two of these incinerators are illustrated, and test data from their operation are presented. Calculations for the effluents discharged from burning 11 lb of refuse/day in such a domestic incinerator indicated that 0.112 cu ft of nitrogen dioxide, 0.063 cu ft of sulfur dioxide, and 0.0505 cu ft of aldehydes would be discharged, which are well below the allowable amounts.

702

1956

A VERSATILE INSTRUMENT FOR MEETING VARIABLE CONDITIONS. Arch. Indus. Health, v. 14, Sept. 1956: 300-301, illus.
DLC (RC963.A14, v. 14)

An instrument system for around-the-compass, and around-the-clock air sampling at any given location is illustrated: It records airborne pollution, the direction from which the pollutants come -- from the 8 cardinal and intercardinal points of the compass--, and weather conditions at the time, including wind direction and velocity. The instrument also has circuits to operate a high velocity sampler at intervals; to cut off operation above a predetermined wind velocity; to control or limit operation within certain humidity ranges; to shut off the samplers and recorders when raining; and to control operation for day or night recording and sampling. If the wind velocity drops near 3 mph, the instrument after a given time stops taking a recorded sample from the direction in which the vane was pointing, and the air is drawn through a "still wind" sampler. The insensitivity to directional air velocities below 1 mph is currently being worked on. (Quoted in part)

703

Vittori, O. A. 1955
[DETERMINATION OF THE SIZE DISTRIBUTION OF ATMOSPHERIC PARTICLES OF CHLORINE WITH THE LIESEGANG REACTION.] Sur la détermination de la distribution des diamètres des particules atmosphériques de chlorure avec la réaction de Liesegang. Geofis. pura e applicata, v. 31, May-Aug. 1955: 90-96. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) DGS

A brief exposition concerning the general Liesegang's reaction and the particular reaction photolitically sensitized for the detection of particles yielding in solution the chloride ion is given. A description follows concerning systems employed for determining the ratio of the size of the chloride particle to the diameter of the corresponding ring. Single direct methods showed that the ratio can be considered constant for one type of gelatin within a few hr interval, and that the ratio of the particle size to the ring diameter does not depend on the diameter of the first one. No difference is found between sodium chloride and magnesium chloride particles. As ratios, values ranging from 6.3 to 9.0 depending on the gelatin type, have been found. In this manner, submicroscopic particles are detectable. The employed methods are described, and a brief summary of them are given: (1) The reaction is allowed to occur, focussing under the microscope the sodium chloride particle; thus, the corresponding ring can be measured. (2) Droplets from an alcoholic (or other organic) solution composed of chloride and a highly colored substance, insoluble in water, are driest. By measuring the size of the insoluble particle, and the diameter of the corresponding ring, the gelatin is calibrated. By means of the same drying technique, some measurements of the atmospheric nuclei have been made, and a distribution has been obtained.

704

Volz, F. 1955
ATMOSPHERIC TURBIDITY AND ITS SPECTRAL EXTINCTION. Geofis. pura e appl., v. 31, May-Aug. 1955: 119-123, illus. (Paper presented at the First International Symposium on Condensation Nuclei, Dublin, Ire., Apr. 1955) DGS

From measurements of the dependence of the haze extinction on the wavelength, data concerning the size distribution of particles can be obtained. A figure in the text shows schematically how the complex haze extinction is obtained by summarizing the extinction coefficients of all particle groups. It can be seen that large particles affect the extinction only at large wavelengths, and very small particles at short wavelengths. Studies at Mainz, Germany, on the indices of the wavelength dependency of the haze extinction, determined from measurements of solar radiation and visibility, showed pronounced seasonal variations with summer values being generally higher than winter.

705

Vonnegut, B. 1952
THIN FILMS OF SUPERSATURATED SOLUTIONS FOR DETECTING, COUNTING, AND IDENTIFYING VERY SMALL CRYSTALLINE PARTICLES. Science, v. 116, Sept. 19, 1952: 300-301. (Paper presented at the Conference on Interfacial Phenomena and Nucleation, Boston Univ., Aug. 21, 1951) DLC (Q1.S35, v. 116)

Thin films of a solution supersaturated with respect to a crystalline substance have been found to be useful tools for detecting, counting, and identifying very small crystalline aerosol particles of the same substance. The technique is discussed for making these films, with varying degrees of supersaturation, by adding various amounts of an unsaturated solution of the crystalline substance in a volatile solvent to a nonvolatile solvent. When fine aerosol particles of this crystalline substance come into contact with the film, the aerosol particles rapidly grow to a size sufficiently large to be seen and counted with a microscope. Precipitation of the aerosol particles onto a clean surface, then contacting this surface with the freshly prepared film, assures a more even growth of crystals. It is also suggested that the films be prepared at some standard temperature and humidity. The system has been used successfully to count particles of sodium chloride, or of silver iodide, having particle diameters of the order of 100 Å.

706

Wachal, A. L. 1955
EXHAUST GAS ANALYSIS. Automobile Engineer, v. 45, July 1955: 295-300.
DLC (TL1.A66, v. 45)

The main constituents in exhaust gases from gas engines are: (1) nitrogen and oxygen; (2) carbon dioxide and water from complete oxidation; (3) carbon monoxide and hydrogen resulting from incomplete oxidation; and (4) organic compounds, sulfur, and nitrogen oxides. Two methods are suggested for analyzing the dry combustion products, and for determining air/fuel ratios; they involve the use of a simplified Orsat apparatus, and a continuous iodine vapor oxidizer. The former method is improved by completely oxidizing the exhaust gases before the analysis, and by interpreting the analysis by reference to calculated curves. The apparatus is illustrated and described. It is indicated that the sample can be taken directly into the system or collected in sampling tubes. The latter method relies on the oxidation of the exhaust gases with the liberation of iodine vapor detected by its light absorption properties. At a flow rate of 5 cc/sec, the method is most effective using 54 g of iodine pentoxide which will last for 50 hr of continuous operation.

707

Wainwright, H. W., 1953
and others.
SELECTIVE ABSORPTION OF HYDROGEN SULFIDE FROM SYNTHESIS GAS. Indus. and Eng. Chem., v. 45, June 1953: 1378-1384.
DLC (TP1.I6, v. 45)

Data from 10 pilot-plant runs, carried out under 300 lb/sq in. gauge pressure, are tabulated in detail. Tripotassium phosphate was used as the scrubbing medium to remove hydrogen sulfide as well as carbon dioxide, from gases and liquid hydrocarbons, at temperatures up to 200°F. Excessive scrubbing rates, and steam consumption have indicated that liquid scrubbing is not entirely economically feasible to remove hydrogen sulfide down to less than 10 grains/100 standard cu ft. One process, widely adopted in Europe, uses potassium N-dimethyl glycine as a gas purifier. Graphical data are given for the scrubbing rates using the latter absorbent. The amount of organic sulfur removed is dependent on: (1) scrubbing rates, (2) gas flow, and (3) types of organic sulfur present in the gas.

708

Walker, E. A., 1953
and J. E. Coolidge.
SEMIEMPIRICAL EQUATION OF ELECTROSTATIC PRECIPITATION. Indus. and Eng. Chem., v. 45, Nov. 1953: 2417-2422.
DLC (TP1.I6, v. 45)

Laboratory equipment and tests of the basic aspects of electrostatic precipitators are discussed in detail. Equipment for the tests, including an air-conditioning unit and a precipitator, is diagrammed. A mathematical expression for the efficiency of the precipitator is given using a comparison of the smoke output with and without the operation of the precipitator. Variations of the precipitator length, exposure time, and particle size in relation to the precipitator efficiency are graphed.

709

Wallis, E. 1955
ATMOSPHERIC POLLUTION AND THE ZINC INDUSTRY. Chem. and Indus., no. 41, Oct. 8, 1955: 1271-1273. DLC (TP1.S6332, no. 41)

The collection of sintering-plant dust and the treatment of sulfuric-acid exit gas from a zinc-products industry are discussed. Three venturi scrubbers having single capacities of 15,000 cu ft/min and operating at a liquid/gas ratio of 7 gal/1000 cu ft/min handle the sinter dust. The scrubbers operate by directing a high velocity gas stream perpendicularly to a curtain of water or other scrubbing medium. The liquor for the 3 systems is supplied through a centrifugal pump at 350 gal/min. To remove the sulfur dioxide and sulfur trioxide from the acid plant, a scrubbing system treats 32,500 cu ft of gas/min, and removes as much as 5 grains/cu ft. The scrubbing liquor is a mixed solution of ammonium sulfite and ammonium bisulfite.

710

Watson, H. A., 1956
and L. B. Berger.
EQUIPMENT FOR ANALYZING MINE ATMOSPHERES, WITH SPECIAL REFERENCE TO HALDANE-TYPE APPARATUS. [Washington, 1956], 51p. (Bureau of Mines. Information circular 7728) DI

Details are given of the analytical procedures for determining carbon dioxide, oxygen, nitrogen, methane, and saturated hydrocarbons with the Haldane gas apparatus. The following are described briefly: Portable and laboratory-type Orsat apparatus for determining carbon dioxide, carbon monoxide, methane, nitrogen, hydrogen, and higher hydrocarbons such as ethane; the pyrotannic method for determining low concentrations (0.01 to 0.20%) of carbon monoxide in the air of ventilated areas; the "phosphomolybdic acid" method for determining carbon monoxide; the phenoldisulfonic acid method for determining total toxic oxides of nitrogen; and gas analysis by infrared absorption.

711

Watson, H. H. 1954
ERRORS DUE TO AN ISOKINETIC SAMPLING OF AEROSOLS. Amer. Indus. Hyg. Assoc. Quart., v. 15, Mar. 1954: 21-25. DLC

In order to obtain true samplings of particulate matter from air streams, it is essential that they be taken under isokinetic conditions since any turbulence or obstruction of the airflow causes great degrees of error. A series of equations dealing with airflow under ideal conditions is given.

712

1955

"WEATHER-TOWER" IS AIR POLLUTION DEFENSE. Petroleum Processing, v. 10, Dec. 1955: 1933. DLC (TP690. A1P37, v. 10)

Periodic readings of wind direction, wind speed, and air temperature information, transmitted from meteorological equipment located on a 70-ft tower, are made at the Socony Mobile Oil Co.'s East Chicago, Indiana plant. In cases of air-pollution or spraying claims against the refinery, these readings can be used to determine plant responsibility. Claims have been made that employees' cars have been sprayed by tarry material, and that refinery emissions have ruined clothes, have killed plants and shrubs, and were ruining the paint on houses.

713

Weaver, E. R. 1955

CONDENSABLE IMPURITIES IN THE AIR OF LOS ANGELES AND VICINITY. (Abstract). Analyt. Chem., v. 27, June 1955: 1035. (Paper presented at 3d National Air Pollution Symposium, Pasadena, Apr. 18-20, 1955)

DLC (TP1. I615, v. 27)

Numerous samples of the condensable vapors in the air of Los Angeles and vicinity were taken by condensation at liquid oxygen temperatures, and were analyzed by mass spectrometer. This paper compares these samples among themselves, with samples from Detroit and Washington, and with raw fuels and products of oxidation of hydrocarbons. (Author's abstract)

714

Weaver, L. 1956

THE SANITARY LANDFILL. I. Amer. City, v. 71, Mar. 1956: 122-124.

DLC (HT101. A6, v. 71)

"Sanitary fill"—the dumping of a mixture of garbage, rubbish, and ashes into a depression or trench, compacting it, and promptly covering it with a layer of earth—satisfies the requirements of any sanitary method of refuse disposal. The recommended 24-in. layer of earth cover effectively controls air pollution caused by smoke and odor.

715

Weaver, L. 1956

THE SANITARY LANDFILL. II. SELECTION OF SITE. Amer. City, v. 71, Apr. 1956: 132-134, 169. DLC (HT101. A6, v. 71)

A primary factor in the location of a sanitary landfill is the availability of suitable land. To determine suitability, the following factors must be evaluated: acreage requirements (1 acre 7-ft deep/10,000 people), topography, availability of suitable cover material, location with respect to residences and industry, accessibility from several areas, distance from the center of the refuse production area, underground and surface water supply, climatology, drainage, and future land use.

716

Weaver, L. 1956

THE SANITARY LANDFILL. PART III. METHOD AND OPERATION. Amer. City, v. 71, May 1956: 134-136, 167-170 DLC (HT101. A5, v. 71)

Three methods of sanitary landfill are: (1) the area method in which the refuse is covered with earth from the same area; (2) the trench method using earth obtained by digging a trench; and (3) the ramp or progressive slope method employing ground just ahead of the dump area. Exposed material should be sprayed to settle dust, or treated with chemicals to prevent disagreeable odors. Sanitary landfills can be operated at costs from \$0.50 to \$1.50/ton. In San Francisco, Calif., costs are \$0.90 to \$0.95/ton; Mandan, N. D., \$0.76/ton; and Winnetka, Ill., \$0.72/ton.

717

Webb, W. L. 1956

PARTICULATE COUNTS IN NATURAL CLOUDS AND FOGS. Jour. Meteorol., v. 13, Apr. 1956: 203-211, illus. DLC (QC851. A283, v. 13)

Measurements of droplet count have been made in fogs, natural clouds, and laboratory clouds. All droplets larger than 0.75-micron radius that were contained in a small volume (approximately 1 cc) of the cloud were included in the sample. Droplet counts measured in radiation fog in the Washington, D.C., area were found to range between 30 and 60 droplets/cc. Samples taken at elevated surface locations in low-level clouds ranged from 100 to 500 droplets/cc. (Author's abstract)

718

Wedding, R. T., 1955
and L. C. Erickson

CHANGES IN THE PERMEABILITY OF PLANT CELLS TO $P^{32}O_4$ AND WATER AS A RESULT OF EXPOSURE TO OZONATED HEXENE (SMOG). Amer. Jour. Botany, v. 42, June 1955: 570-575.

DLC (QK1. B345, v. 42)

Artificial smog resulted in a decrease in the permeability of the cells of pinto bean leaves to radioactive phosphate when the plants were exposed to a mixture of 1 ppm of ozone with an excess of 1-n-hexene for periods up to 3 hr. Longer exposures resulted in a reversal of this effect, and increased the permeability of the leaf cells to phosphate.

This increased permeability was associated with the appearance of visible smog damage on the leaves. Potato-tuber disks showed similar effects from smog on uptake of P^{32} from a buffer solution, and on both uptake and loss of water over short periods of time. (Authors' abstract)

719

Weinheimer, C. M. 1954
PRESENT AND FUTURE STATUS OF THE FLY-ASH DISPOSAL PROBLEM. Utilization, v. 8, June 1954: 31-34. (Paper presented at The American Power Conference, sponsored by Illinois Institute of Technology, Mar. 24-26, 1954)
DLC (TP315. U85, v. 8)

Although the problem exists in all large industrial coal-burning plants, the discussion here is limited to the fly ash collected in the burning of coal in the utility industry which owns more than 80% of all dust-control equipment currently in use. Because the characteristics of fly ash vary according to the type of burning equipment, the problem is considered briefly in connection with stoker-fired furnaces, pulverized-coal furnaces, and cyclone furnaces. In 1953, it was estimated that pulverized fly ash was being collected at a rate of 6,100,000 tons/yr with a possibility of an increase to 16,800,000 tons by 1963. Although some commercial uses for the ash have been found, a large quantity of fly ash must be disposed of by dumping. Fifty-two utilities reported that it cost an average of $0.66/ton to dispose of their fly ash in 1948; the cost to The Detroit Edison Co. is now about $0.95/ton. Two outlets for fly-ash utilization look promising: sintering it to form a satisfactory lightweight aggregate for use in the cinder-block industry, and producing a cellular lightweight masonry unit by autoclaving a mixture of flyash, lime, and an air-entraining agent.

720

Wentworth, J. T., 1955
and W. A. Daniel.
FLAME PHOTOGRAPHS OF LIGHT-LOAD COMBUSTION POINT THE WAY TO REDUCTION OF HYDROCARBONS IN EXHAUST GAS. S. A. E. Trans., v. 63, 1955: 602-617. (Paper presented at the S. A. E. Golden Anniversary Annual Meeting, Detroit, Jan. 10-14, 1955) DBS

An investigation to determine why the hydrocarbon content of automobile exhaust gas increases abruptly during deceleration and how this can be prevented is described. High-speed motion pictures of the flame, taken through a quartz-window cylinder head, show that residual-gas dilution is the major cause of incomplete combustion. The concentration of hydrocarbons in the exhaust can be reduced either by admitting extra air and fuel to the intake manifold to limit vacuum attained during deceleration or by shutting off the fuel during deceleration. Appendixes describe the method used for determining % unburned hydrocarbons in exhaust gas, and give the procedure for determining residual-gas weight fraction from Orsat gas analyses. (Authors' abstract in part)

721

Westergaard, V. 1955
TRAVELING GRATES FIND A NEW FIELD OF USEFULNESS. Combustion, v. 26, June 1955: 40-45, illus. DLC (TJ1. C8, v. 26)

Three municipal incinerators constructed under New York City's 70 million dollar program to handle 13,220 tons of refuse/day are discussed and illustrated. Each incinerator is equipped with 4 furnaces designed to handle from 200 to 250 tons of refuse/day. In the South Shore plant, fly ash settled from the fumes and the expansion chambers is removed from the equipment once a week; chimney temperatures and air draft are recorded automatically, and incinerator residues are used as landfill.

722

Westhaver, L. J. 1956
THE METALS INDUSTRY AND AIR POLLUTION ABATEMENT. Indus. Wastes, v. 1, Jan.-Feb. 1956: 118-120, illus. (Paper presented to the Southern California Conference on Elimination of Air Pollution, Los Angeles, Calif., Nov. 10, 1955)
DLC

The metals industry recognizes the problems of air pollution and of the need for pollution abatement, as well as its obligation to the community. Among examples of control measures used in the industry are electrostatic precipitators or baghouses in the operating cupolas of gray-iron foundries; reverberatory or electric furnaces to minimize dust and fume generation; and slag covers in melting operations in nonferrous foundries. In the steel-producing areas around Los Angeles (Calif.) the use of diesel-electric equipment, smoke detection devices, and electrostatic precipitators, and the education of all personnel employed in the operation of potential "smog"-producing equipment are employed to control air pollution.

723

Westlin, K., 1955
and L. J. Czerwonka.
SAMPLING AND ANALYSIS OF INDUSTRIAL PROCESS DUST. Amer. Indus. Hyg. Assoc. Quart., v. 16, Dec. 1955: 283-292, illus. DLC

A technique is described for the analysis of subsieve-size dust particles in hot and moist gases. Also a particle-size analysis procedure is presented for process dust studies. It was evolved to overcome the deficiences of the various conventional field-sampling methods.

724

1956
WET OR DRY: THIS TOOL KNOWS. Chem. and Eng. News, v. 34, Apr. 16, 1956: 1932.
DLC (TP1. C35, v. 34)

At the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, F. A. Keidel of

DuPont described a moisture-determination analyzer, in which water absorbed from a gas stream by a thin viscous film is quantitatively electrolyzed to hydrogen and oxygen. "It is possible to analyze with an error of not over 5% of scale indications throughout the range of 1 to 1000 ppm." The instrument does not work well with basic substances such as ammonia or materials which will react with phosphorous pentoxides. Air, hydrogen, aromatic hydrocarbon vapors, chlorine, hydrogen chloride, and sulfur dioxide can be analyzed.

725

Whitby, K. T. 1955
A RAPID GENERAL PURPOSE CENTRIFUGE SEDIMENTATION METHOD FOR MEASUREMENT OF SIZE DISTRIBUTION OF SMALL PARTICLES. I. APPARATUS AND METHOD. Heating, Piping, and Air Conditioning, v. 27, Jan. 1955: 231-237, illus. DLC (TP7201.H45, v. 27)

A description is given of the apparatus and basic principle of a new method of centrifuge sedimentation analysis which has been found to be of great practical value for measurement of size distribution of dusts in the 0.05- to 100-micron size range. Extensive use by 6 different industrial firms has demonstrated that the method for the first time permits economical and rapid size analysis in the 0.05- to 5-micron size range occupied by most atmospheric dusts. Included are descriptions and illustrations of apparatus, basic derivation, and outlines for practical methods of calculating necessary tables before a run is begun, and size analysis results. (Author's abstract in part)

726

Whitby, K. T. 1955
A RAPID GENERAL PURPOSE CENTRIFUGE SEDIMENTATION METHOD FOR MEASUREMENT OF SIZE DISTRIBUTION OF SMALL PARTICLES. II. PROCEDURES AND APPLICATIONS. Heating, Piping, and Air Conditioning, v. 27, June 1955: 139-145, illus. DLC (TP7201.H45, v. 27)

Data are included illustrating the reproducibility, comparative accuracy, and principal applications of the method. Tables show chief sedimentation liquids and dispersing agents found useful, and the dispersion systems used when various materials are analyzed. Graphs [and tabular data] show results of analyses on many finely divided materials including flours, pigments, albumin, industrial dusts, fly ash, and an atmospheric dust sample. The method has proved useful and rapid. It is hoped that its use will permit analysis of atmospheric dusts containing particles as small as 0.2 micron. (Author's abstract)

727

Whitmore, R. L. 1955
THE SEDIMENTATION OF SUSPENSION OF SPHERES. Brit. Jour. Appl. Phys., v. 6, July 1955: 239-244. DLC (QC1.I548, v. 6)

An experimental investigation of the theoretical relationship between the concentration and settling rate of particles falling in a fluid was undertaken. Methyl-methacrylate polymer was used as the sedimenting particles, polystyrene as the suspended particles, and an aqueous solution of lead nitrate as the fluid. The samples were obtained by mechanical dry-sieving; the apparatus consisted of glass cylinders of 2 sizes, the longer being used for the majority of the experiments. Settling data from these tests are tabulated and graphed.

728

Whittingham, G. 1955
THE CORROSIVE NATURE OF COMBUSTION GASES FROM CARBON MONOXIDE FLAMES CONTAINING SULPHUR OXIDES. Jour. Appl. Chem., v. 5, July 1955: 316-322. DA

Mild steel corrosion probes have been used to determine the relation between surface temperature and amount of iron corroded by the flue gases of relatively low moisture content from a diffusion flame of carbon monoxide, to which additions of sulfur dioxide were made. Complementary measurements have been made of the percentage conversion of sulfur dioxide to sulfur trioxide, and of the rates of acid buildup on a dewpoint meter. Over the temperature range employed [about 20°C to 120°C], corrosion showed a maximum at 66° to 70° [C], and the humidity of combustion air was found to have a significant effect on corrosion. From the dewpoint meter readings and other data, theoretical rates of acid deposition on the acid probe have been calculated and these and the experimental values are compared and discussed. (Author's abstract)

729

Wilcox, J. D., and W. R. VanAntwerp. 1955
A SAMPLING TECHNIQUE FOR SMALL AIRBORNE PARTICULATES. Arch. Indus. Health, v. 11, May 1955: 422-424, illus. DLC (RC963.A14, v. 11)

A sampling technique is described which allows the deposition of particulate material directly onto an electron microscope specimen film supported on a mesh screen which is mounted in the supporting cap used in the microscope. Special slides and screen, designed to accomodate this assembly, are used in the 5-stage cascade impactor which collects graded sample fractions of particles from the air. These samples fall within the 1- to 100-micron range for light-microscope analysis, or 0.01- to 10-micron range for electron-microscope analysis. Although this general technique has been used successfully with centrifugal, thermal, and gravity methods of particle deposition, the cascade impactor has shown some superiority in measuring heterogeneous samples.

730

Wilcox, J. D. 1956
ISOKINETIC FLOW AND SAMPLING. Jour. Air Pollut. Control Assoc., v. 5, Feb. 1956: 226, 245, illus. (Presented at the Conference on the Physics of Cloud and Precipitation Particles, Woods Hole, Mass., Sept. 7-10, 1955) DLC

In order to obtain an accurate sample of airborne particulate matter, isokinetic conditions must prevail. These isokinetic conditions are those which exist "when there is no divergence of flow lines around the sampler inlet. The velocities of the sampled and sampling streams must be equal, and the sampler must face directly into the sampling stream...." Consideration of the following parameters is also necessary to ensure representative sampling: (a) "Length of the sampling tube. (Tube losses are reduced by using a shorter sampling tube.) (b) Diameter of the sampling tube.... (c) Particle size distribution and density of the material. (These factors aid in the estimation of the inertial effects of the airborne particulate material.)"

731

Wilkening, M. H. 1952
NATURAL RADIOACTIVITY AS A TRACER IN THE SORTING OF AEROSOLS ACCORDING TO MOBILITY. Rev. Sci. Instrum., v. 23, Jan. 1952: 13-16. DLC (Q184.R5, v. 23)

Natural radioactivity in the atmosphere is used as a "tracer" in the study of aerosol particle-size distribution in the submicroscopic range. Particulate matter is collected by a device which first ionizes the particles, and then separates them according to their mobilities. The results indicate that most of the natural radioactivity in the atmosphere attaches itself to particles having diameters in the range 0.001 to 0.04 micron. A predominant grouping of the activity occurs in the vicinity of 2 particle diameters, 0.009 and 0.018 micron. The relationship between the distribution of radioactivity, and the abundance of particles in different size ranges is discussed. (Author's abstract)

732

Wilkins, E. M. 1956
EFFECTS OF TOPOGRAPHY ON WINDS AND DIFFUSION CONDITIONS AT THE NATIONAL REACTOR TESTING STATION. Jour. Air Pollut. Control Assoc., v. 6, May 1956: 14-16, 51, illus. DLC

The effect of topography on winds and diffusion conditions (mountain-valley breezes, channeling, descending currents, basin effects, large eddy, and zones of wind shear) in the Snake River Plain of Eastern Idaho is discussed. The circulation pattern associated with wind shear phenomena is being studied by means of smoke observation, wind and temperature soundings, and tower instrumentation. The possibility of recirculation of effluent, inherent in mountain-valley breezes and standing eddies, is of no concern for anticipated operational effluent releases, but must be taken into account for disaster planning. An illustration shows the effect of shear zone on a smoke plume from a 250-ft stack at the National Reactor Testing Station.

733

Willard, B. J. 1954
SPECIFIC GRAVITY OF GASES. Instruments and Automation, v. 27, June 1954: 945-949. DLC (TA165.A2, v. 27)

Six methods for determining the specific gravity of gases are discussed, and apparatus for each method is diagrammed. The direct-weighing method depends on the comparison of the weight of a volume of a gas against air under the same conditions. The gas-balance method involves the buoyancy of a float filled with air compared with the same float filled with a gas. The specific gravity can be determined on the basis of the rate of flow of a gas through an orifice. Similarly, the viscous-drag method employs the measurement of the fluid friction of a gas passing through an instrument. The other 2 methods are the kinetic-pressure increase between the center and tip of a fan blade, and the column-weighing of a gas and of air.

734

1955
WIND CONDITIONS REGULATE COUNTER-ODORANT ADDITION. Food Processing, v. 16, Dec. 1955: 30-31, illus. DLC (TP373.F55, v. 16)

An instrument is illustrated that regulates the operation of a counter-odorant spray system, which is used to control objectionable odors from stacks. The circuit is regulated to activate the spray at predetermined wind directions and velocities.

735

Winkelmann, H. A. 1952
STATIC EXPOSURE TESTING OF AUTOMOTIVE COMPOUNDS. Indus. and Eng. Chem., v. 44, Apr. 1952: 841-849. DLC (TP1.I6, v. 44)

Deterioration of rubber products on outdoor exposure is due to the action of sunlight and ozone. Ozone cracking results when rubber is exposed under strain. This study was undertaken to determine the factors which influence the resistance of rubber products to ozone. The selection of a polymer, such as natural rubber, GR-S, neoprene, or butyl rubber, has a marked influence on ozone resistance of automotive rubber products. In outdoor exposure the effect of sunlight, ozone, heat, and water varies seasonally in Fla., Calif., Mich., and Ill. (Author's abstract in part)

736

Woltz, S. S., 1953
R. O. Magie, and C. M. Geraldson.
STUDIES ON LEAF SCORCH OF GLADIOLUS.

Proc. Florida State Hort. Soc., v. 66, 1953:
306-309, illus. DA

A condition called leaf scorch has been observed in the leaf tips of gladiolus in the fields 2-3 days after a heavy fog. Preliminary experimental studies on leaf scorch have suggested that this physiological disorder may be caused by fluorine compounds in the atmosphere. Higher fluorine content of the plants at 2 locations was associated with leaf scorch which was not found at a third location where the fluorine content of the leaf tips was lower.

737

Wong, J. B., 1955
W. E. Ranz, and H. F. Johnstone.
INERTIAL IMPACTION OF AEROSOL PARTICLES ON CYLINDERS. Jour. Appl. Phys., v. 26, Feb. 1955: 244-249. DLC (QC1.J83, v. 26)

The inertial impaction of aerosol particles on cylinders, a study fundamental to the analysis of the process of filtration of dust and smoke, was investigated to determine the relationship between the efficiency of impaction and the inertial parameter, the Reynolds number of flow, and the effect of interception. The impaction of sulfuric acid aerosols of nearly uniform size ranging from 0.6 to 1.4 microns in diameter, on 2 platinum wires, 29 and 83 microns in diameter, and 2 tungsten wires, 53 and 106 microns in diameter, was measured at several velocities of flow past the wires. Reynolds numbers ranged from 13 to 330. For values of the square root of the inertial parameter below 1.4, the experimental efficiencies of impaction agree with previous predictions, but are higher when the calculated values are greater than 1.4. (Authors' abstract in part)

738

Woolrich, P. F. 1954
A NEW ELECTROSTATIC SAMPLE COLLECTOR PERMITTING DIRECT MICROSCOPIC EXAMINATION. Amer. Indus. Hyg. Assoc. Quart., v. 15, Dec. 1954: 267-268, illus. DLC

An electrostatic sample collector for use in the field has been developed for qualitative analyses of particulate matter which is deposited directly on glass slides. It is hoped that the collector can be utilized ultimately in the determination of particulate diameter as a function of position on the slide. Further photomicrographic investigation of samples obtained is necessary before the performance of the collector can be evaluated.

739

Wright, B. M. 1953
THE IMPORTANCE OF THE TIME FACTOR IN THE MEASUREMENT OF DUST EXPOSURE. Brit. Jour. Indus. Med., v. 10, Oct. 1953: 235-240. DLC (RC963.A23, v. 10)

Two hypotheses of the relative importance of time and concentration in the production of pneumonoconiosis are widely accepted. On one, the "peak" hypothesis, high concentrations are believed to be disproportionately important, while on the other, or "average" hypothesis, concentration and time are believed to be equally important. The evidence for or against the 2 hypotheses is considered, and it is concluded that the "average" hypothesis is to be preferred. The effects of this conclusion on dust sampling and dust suppression practice are discussed. (Author's abstract)

740

Wright, B. M. 1954
A SIZE-SELECTING SAMPLER FOR AIRBORNE DUST. Brit. Jour. Indus. Med., v. 11, Oct. 1954: 284-288, illus. DLC (RC963.A23, v. 11)

The composition of airborne dust is liable to vary with particle size. Only particles less than 7 microns in average diameter are retained in the lungs long enough to cause pneumoconiosis. Samples of airborne dust for analysis in connection with pneumoconiosis must therefore be free of particles larger than this. The separation of these particles should be carried out during the process of sampling. An apparatus for collecting bulk samples of airborne dust is described in which a horizontal elutriator is used to separate off the oversize fraction while sampling, the "respirable" fraction being collected in a "soxhlet" thimble filter. A compressed air ejector is used to draw air through the sampler, and a critical orifice controls the flow. The theoretical principles on which the design of the sampler is based are discussed, and the method of testing its performance is described. (Author's summary).

741

Wright, B. W. 1953
GRAVIMETRIC THERMAL PRECIPITATOR. Science, v. 118, Aug. 14, 1953: 195. DCU

A gravimetric thermal precipitator for the sampling of dust for animal inhalation experiments is described. The unit is of simple construction. The deposit rate is governed almost exclusively by the power input.

742

Wurts, T. C. 1953
A RATIONAL APPROACH TO AIR-POLLUTION LEGISLATION (Letter to the editor). Arch. Indus. Hyg. and Occupat. Med., v. 7, Mar. 1953: 255-257. DLC (RC963.A14, v. 7)

This is a discussion of a paper by G. E. Best (Arch. Indus. Hyg. and Occupat. Med., v. 5, June 1952: 517-526). Two important factors are mentioned as being overlooked in the original paper namely, air stability and the presence of active aerosols. Legislative proposals to centralize the registration of effluents, and to set up a technical research bureau at the state level, are both thought to be impractical. Doubts are also expressed concerning the practicality of a local commission serving without compensation to administer control of a local air pollution area. The permit system, as against the committee recommendation for a "registration of effluents", is discussed. The use of advisory committees is strongly recommended. Further, the creation of a spirit of mutual cooperation between industry and the air-pollution-control bureau, will help to bring about the idealistic situation of control areas which go beyond the boundaries of political subdivisions or municipalities.

743

Yaffe, C. D. 1956
SOME BASIC PRINCIPLES AND PROBLEMS OF AIR SAMPLING IN INDUSTRY. Publ. Health Rep., v. 71, Sept. 1956: 923-931, illus.
DLC (RA11. B17, v. 71)

Brief discussions are presented on types of airborne contaminants (dusts, fumes, gases, vapors, and mists); appraisal of health hazards; size and type of sample; type of instrument; and maximum and specific limits of contamination. Different types of air samplers and related equipment, all of which have in common small size and simplicity of operation, are illustrated. The section on types of instruments presents some information on their use.

744

Yarwood, C. E., 1954
and J. T. Middleton.
SMOG INJURY AND RUST INFECTION. Plant Physiol., v. 29, July 1954: 393-395, illus.
DA

Bean and sunflower leaves, infected with rust (Uromyces phaseoli or Puccinia helianthi), were found to be much less damaged by smog, or by artificially-produced smog (ozonated olefins), under controlled conditions than were similar, normal leaves. Rust-infected plant tissue, in which the rust mycelium was killed by heat, was still resistant. The protection from smog attack afforded to the plant tissue by rust infection could not be explained by the closure of the stomata or by the high content of pantothenic acid found in infected tissue; it appeared to result from some substance which diffuses beyond the limits of the rust mycelium.

745

Yocom, J. E., 1956
G. M. Hein, and H. W. Nelson.
A STUDY OF THE EFFLUENTS FROM BACKYARD INCINERATORS. Jour. Air Pollut. Control Assoc., v. 6, Aug. 1956: 84-89, illus. DLC

The incinerator used in these studies is diagrammed, and pictured with the auxiliary testing equipment. The composition of the charges and the combustion data are tabulated. The sampling rate, 2.5 cu ft/min, was proportional to the discharge rate from the incinerator. The following methods were used to study the effluents from the incinerator: (1) gases collected by condensation in liquid-nitrogen traps or in evacuated gas bulbs were analyzed by infrared spectral analysis; (2) the liquid condensate from the volatilization of the liquid-nitrogen cooled sample was analyzed by chemical methods; and (3) the effluents were collected in evacuated flasks containing various reagents, and samples removed later for analysis. Data from the analyses of the effluents are tabulated.

746

York, J. L., 1952
and H. E. Stubbs.
PHOTOGRAPHIC ANALYSIS OF SPRAYS. Trans. Amer. Soc. Mech. Engineers, v. 74, Oct. 1952: 1157-1162. DLC (TJ1. A7, v. 74)

An experimental method is described for determining the size distribution and velocities of drops in a spray. Photographs are taken of a small known volume of the spray, and the images of the drops, magnified 100 times on a screen, are counted. The size distribution is measured by a comparison of the images with standard drop sizes. The velocity of 20 ft/sec for the drops studied was determined by taking 2 exposures on the same film and measuring the displacement of the drops in the interval between exposures. The technique is applicable to sprays in which the diameters of drops range from 15-500 microns, and gives results which differ by less than 20% from the metered values of total flow rate. Diagrams of the photographic arrangement, and graphs of the results are given.

747

Yunghans, R. S. 1956
THE DETERMINATION OF DIACETONE ALCOHOL IN AIR. Arch. Indus. Health, v. 13, Apr. 1956: 336-339. DLC (RC963. A14, v. 13)

Detailed instructions are given for a rapid and simple chemical procedure for determining the diacetone alcohol content in air samplings. The method is also applicable to a number of other solvents present as air pollutants.

748

Zaidi, S. H., 1956
E. J. King, C. V. Harrison, and
G. Nagelschmidt.
FIBROGENIC ACTIVITY OF FREE SILICA OF DIFFERENT PARTICLE SIZES. Arch. Indus. Health, v. 13, Feb. 1956: 122-132, illus.
DLC (RC963. A14, v. 13)

Rats were injected intratracheally, and mice intravenously, with flint particles (containing 99% SiO_2) ranging in size from 0.2 to 4 microns. The amounts of the different size particles used gave equal areas of particle surface. The maximum fibrosis in the lungs of the rats was found to be caused by the particles which were between 1 and 2 microns in diameter. Those causing the greatest amount of fibrosis in the livers of the mice lay between 0.2 and 2 microns in diameter.

749

Zimmer, R. I. 1955
ATMOSPHERIC CORROSION OF MILD STEEL IN A CHEMICAL PLANT. Corrosion, v. 11, June 1955: 17. DLC (TA462.C65, v. 11)

Atmospheric corrosion is attributed to 3 factors: (1) humidity; (2) atmospheric constituents; and (3) the composition of the metal acted upon. Tests of corrosion rates were made in 3 different atmospheres, and the results are plotted. In a comparison of the cost of replacing corroded metals, and the cost of surfacing the metals to prevent corrosion, the latter proved to be more economical.

750

Zimmerman, P. W. 1955
CHEMICALS INVOLVED IN AIR POLLUTION AND THEIR EFFECT UPON VEGETATION. Boyce Thompson Inst. Plant Res., Professional Paper, v. 2, Dec. 1955: 124-145. (Reprinted from Proc. Governor's Conf. and Exhibit on Atmospheric Pollution, New Jersey. State Department of Health, Trenton, N. J., Feb. 19-20, 1952, p. 23-31, [1955]) DA

Observations and results of work done at the Boyce Thompson Institute involving gases and vapors in relation to air pollution are reviewed briefly. Some information is given on the characteristic injury caused, the area of the plant most readily injured, the changes in susceptibility of the plant to injury according to the condition of the plant, and the comparative susceptibility of various species of the plant to the gas or vapor. The gases considered are: SO_2, HF, Cl_2, H_2S, NH_3, Hg, ethylene and CO, and vapors of 2, 4-D (2, 4-dichlorophenoxyacetic acid) and other hormone-like chemicals. Several tables of data give correlations between damage, vapor concentration, and length of exposure.

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